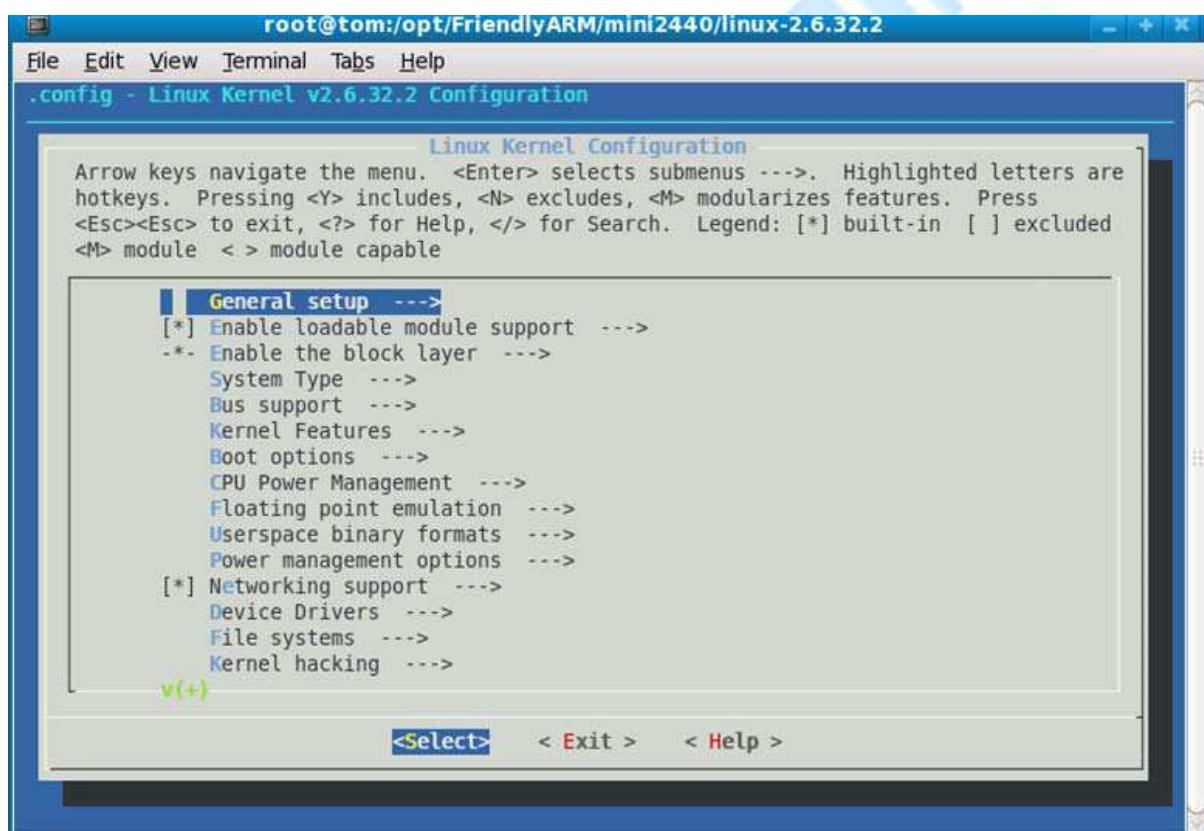


### 6.3 Handmade custom Linux kernel

Above we use the default configuration file and compile kernel, in fact the Linux kernel configuration options are many, here we have some common options are to be illustrated, to help you become familiar with kernel configuration, they need to customize kernel.

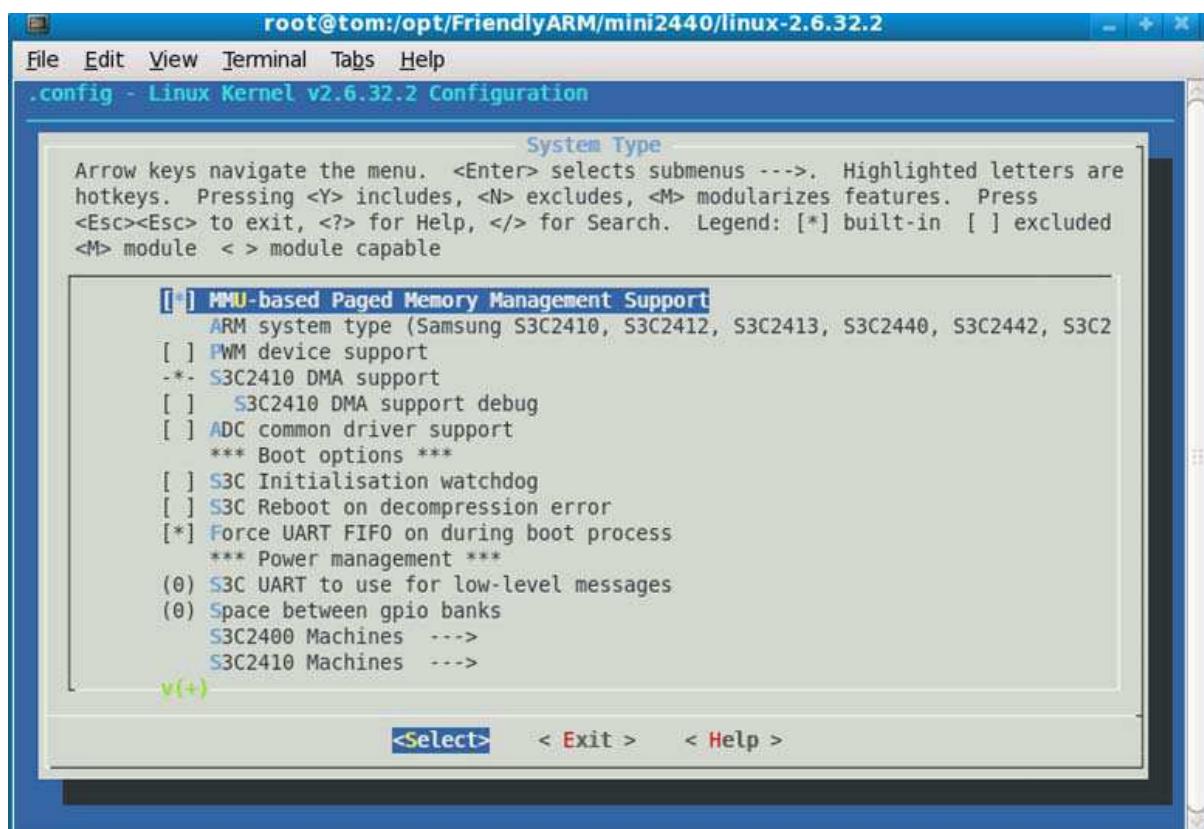
Note: To help you familiar with all kernel configurations, be sure to follow the method described in the chapter 6.1 and download a default configuration file, such as config\_mini2440\_w35, otherwise the following options may not appear.

Run “make menuconfig”, go to the kernel configuration main menu



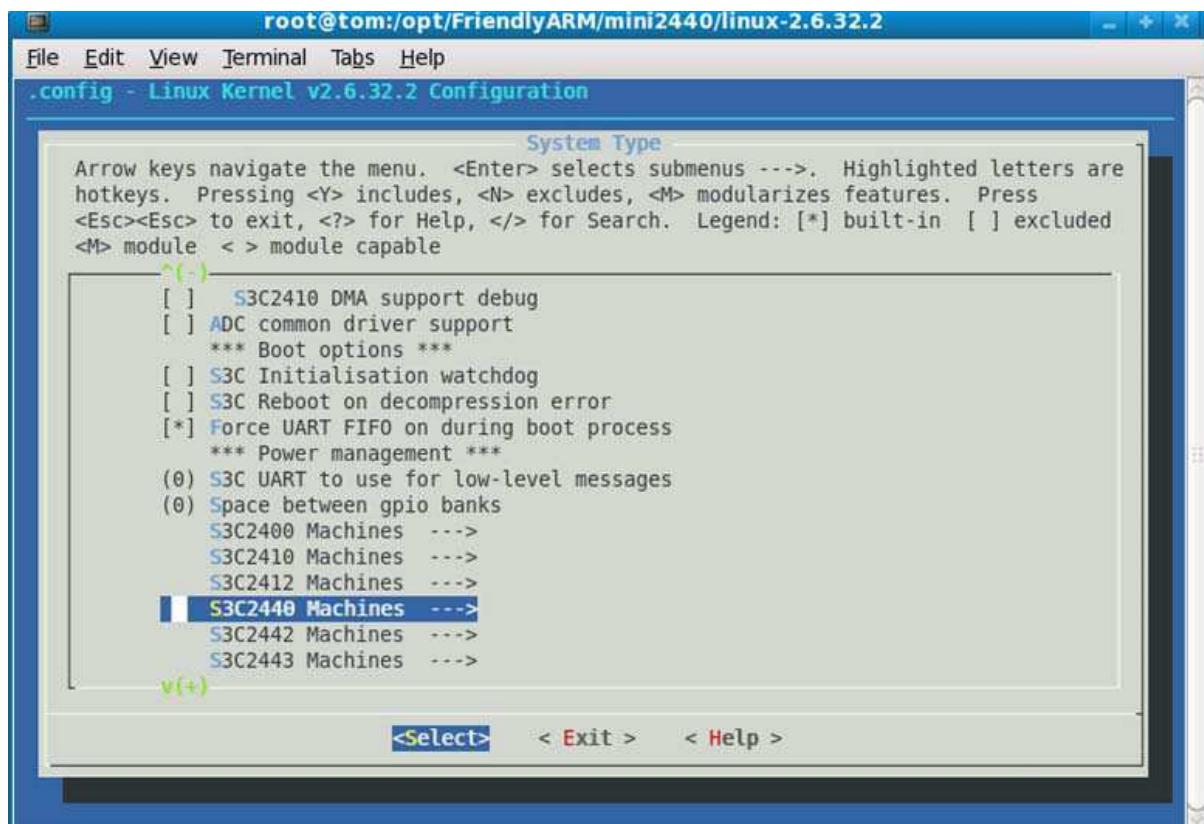
### 6.3.1 CPU platform configuration options

In the main menu, select System Type, press enter.

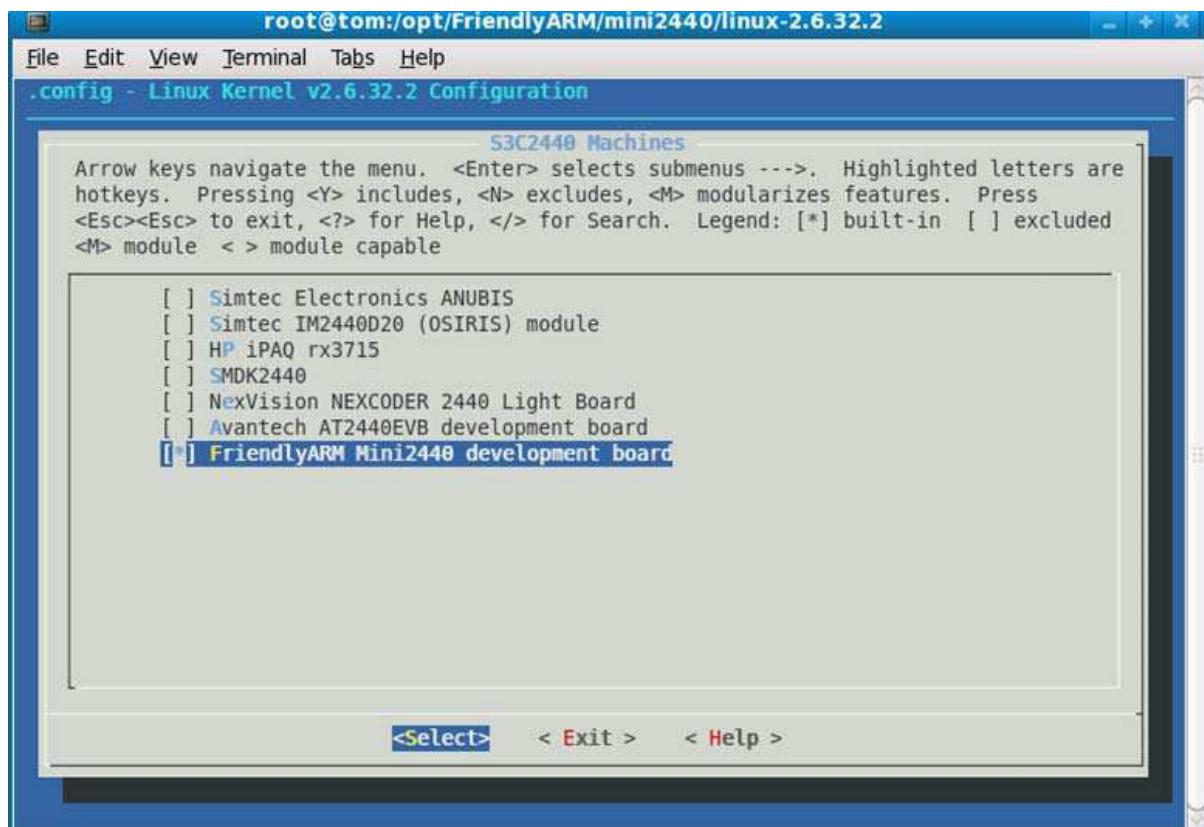


You can see the system uses most of the options marked S3C2410, S3C2410, and S3C2440 this is because a lot of address and register address setting is exactly the same.

If you want to select the class option, then you use the up and down arrow keys to control platform have options to find the S3C2440 or S3C2400 machines can enter sub-menu.

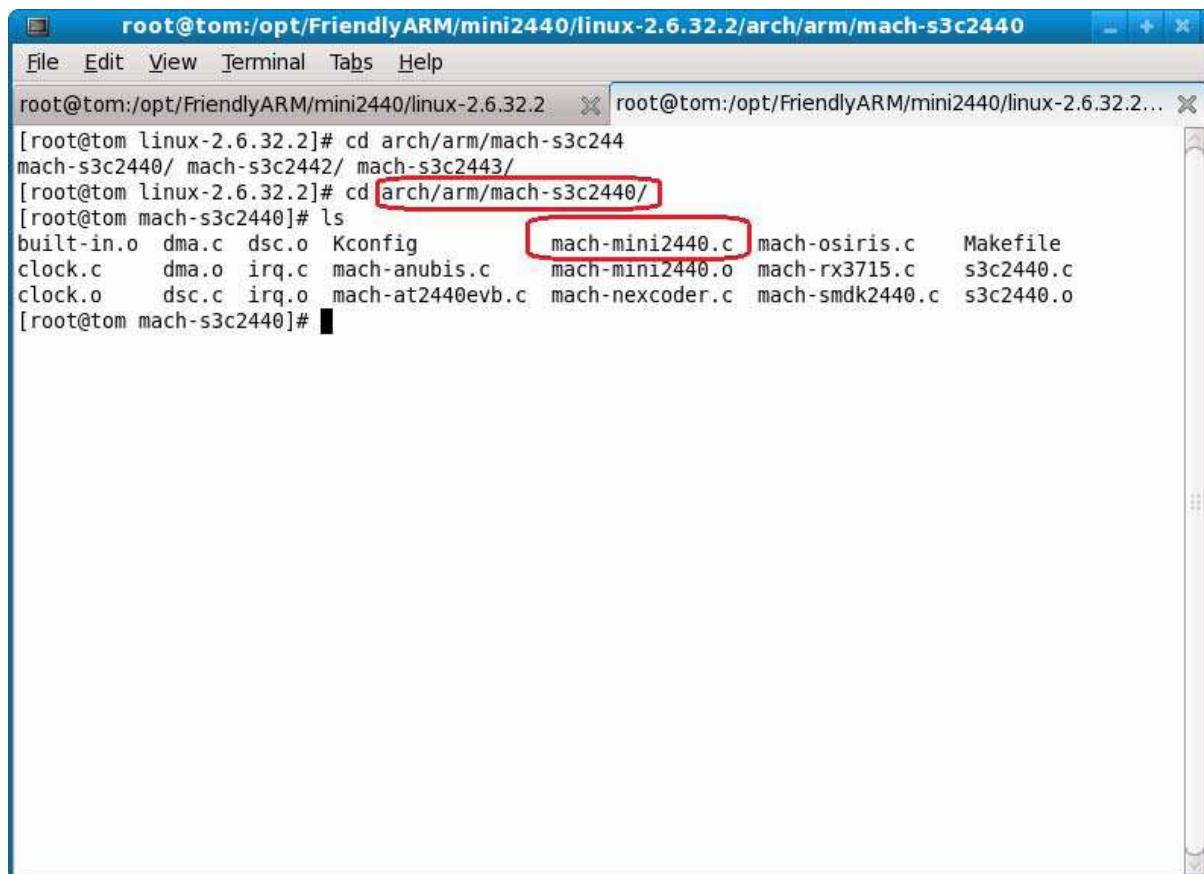


You can see there are many common objective boards using the S3C2440 platform options, in this select "FriendlyARM Mini2440 development board", as shown in Figure.



They correspond to /arch/arm/mach-s3c2440/mach-\* beginning of the file,

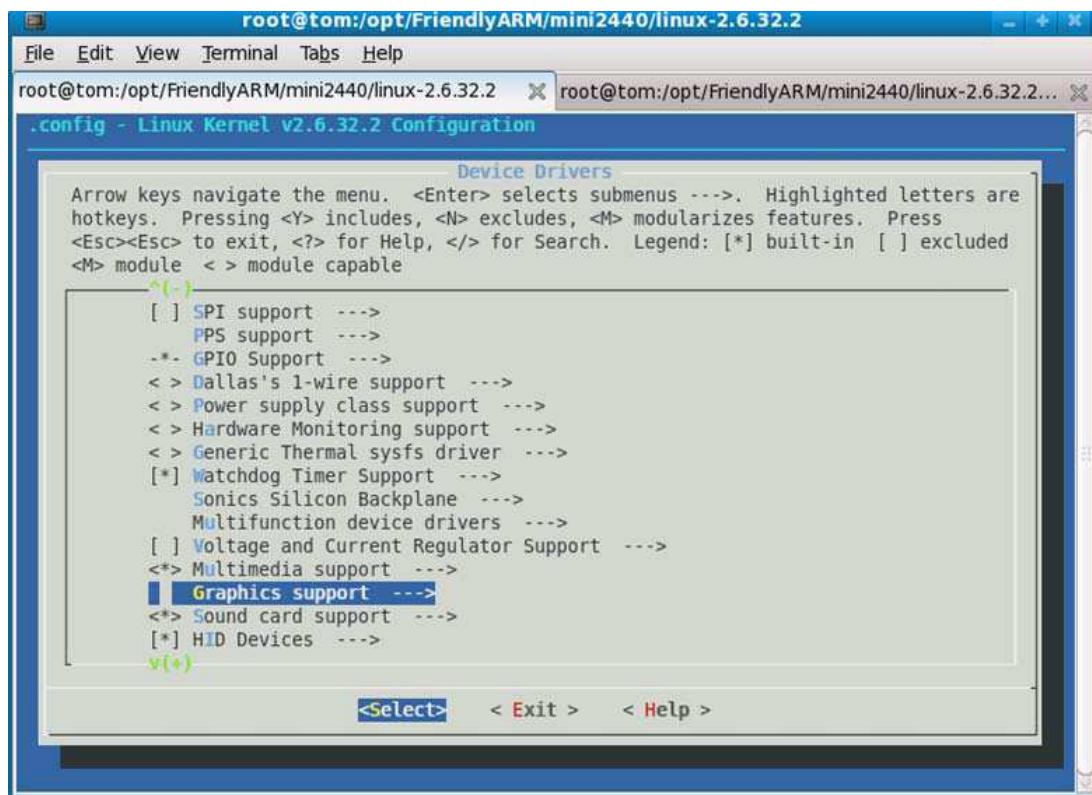
This corresponds to mach-mini2440.c, in this file will use a machine code MACH\_TYPE, the machine code of the definition file arch “/arm/tools/mach-types”, we have machine code for the 1999 of development board, it also corresponds to the source code vivi include/platform/smdk2440.h file MACH\_TYPE



```
root@tom:/opt/FriendlyARM/mini2440/linux-2.6.32.2/arch/arm/mach-s3c2440
File Edit View Terminal Tabs Help
root@tom:/opt/FriendlyARM/mini2440/linux-2.6.32.2... root@tom:/opt/FriendlyARM/mini2440/linux-2.6.32.2...
[root@tom linux-2.6.32.2]# cd arch/arm/mach-s3c244
mach-s3c2440/ mach-s3c2442/ mach-s3c2443/
[root@tom linux-2.6.32.2]# cd arch/arm/mach-s3c2440/
[root@tom mach-s3c2440]# ls
built-in.o dma.c dsc.o Kconfig          mach-mini2440.c mach-osiris.c  Makefile
clock.c    dma.o irq.c mach-anubis.c   mach-mini2440.o  mach-rx3715.c  s3c2440.c
clock.o   dsc.c irq.o mach-at2440evb.c mach-nexcoder.c mach-smdk2440.c s3c2440.o
[root@tom mach-s3c2440]#
```

### 6.3.2 Configuration of LCD driver for each size and backlight control support

In the main menu, select Device Drivers, press enter, find the option shown, press enter:



Found in Figure options, and then enter into the

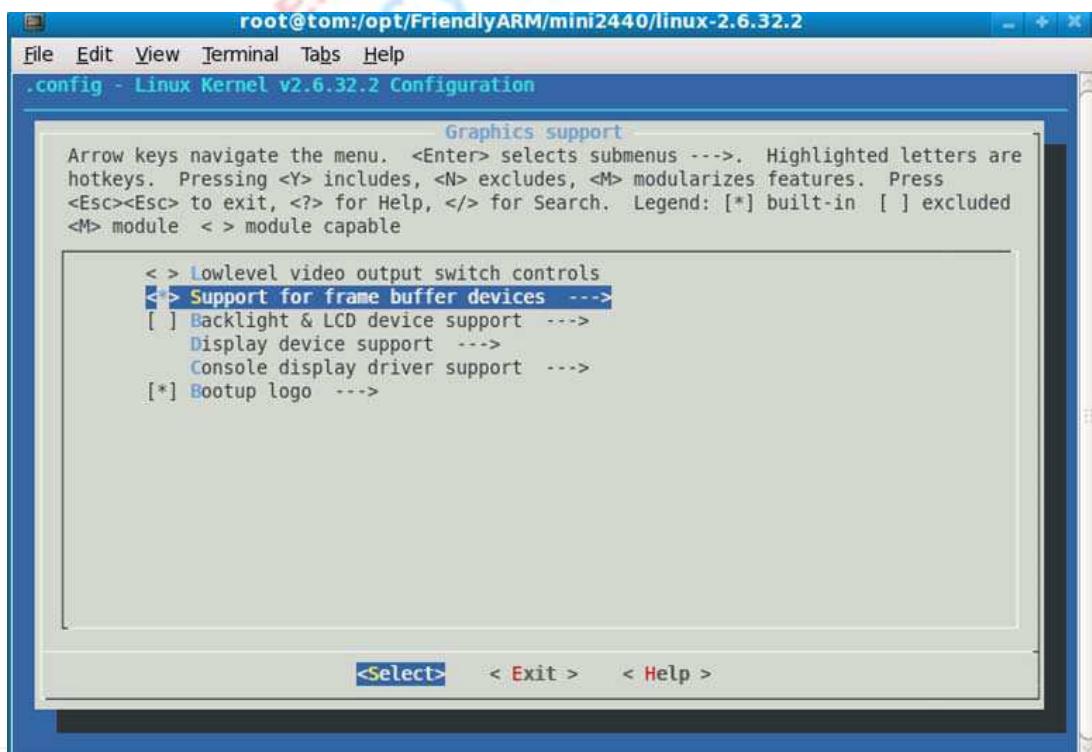
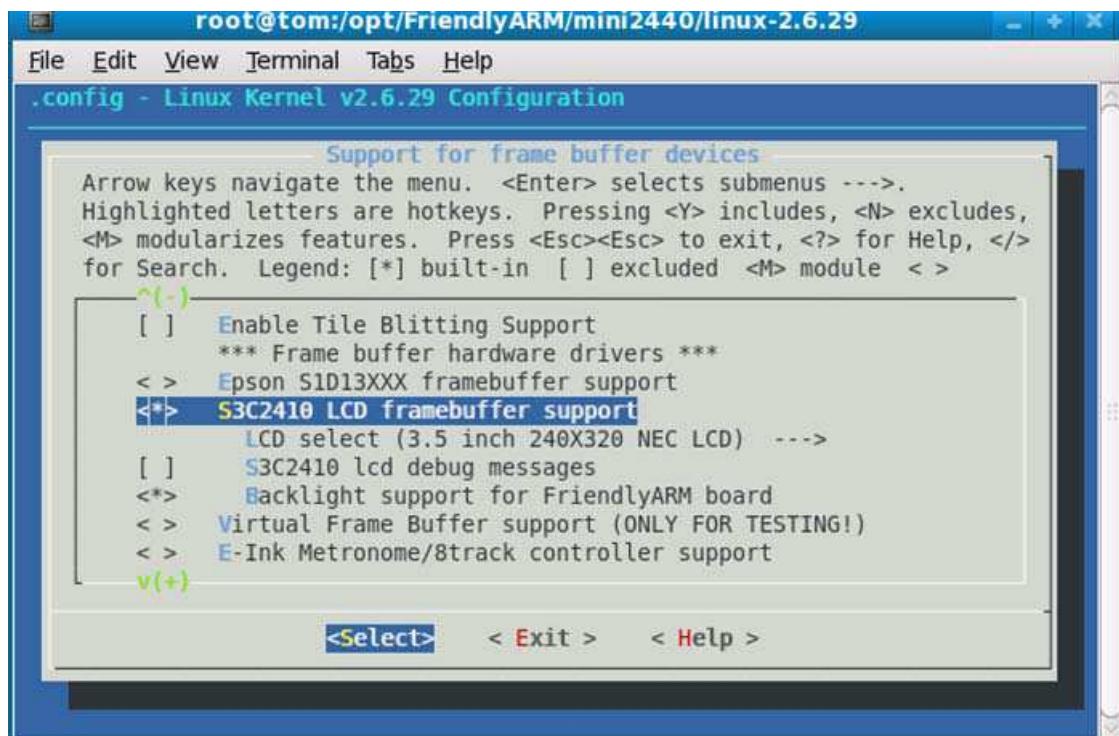
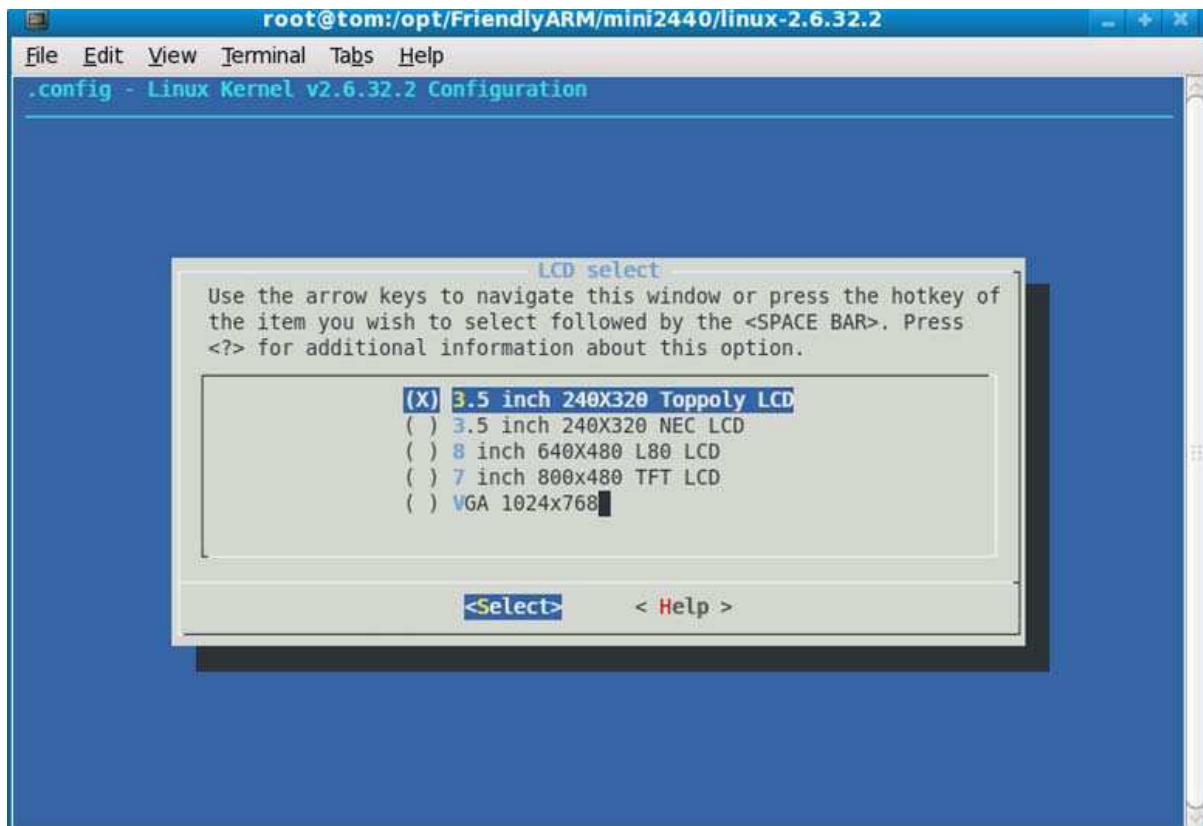


Figure similar interface, and find options shown, select the figure Backlight support by press spacebar until shown <\*>. Also select S3C2410 LCD frame buffer support by press spacebar until shown <\*> too.



Then select the LCD select, press enter, as shown, you can see we load the default configuration config\_mini2440\_t35 in this selection TPO 3.5" LCD (3.5-inch 240x320 Toppoly LCD), you can also change other types of needs LCD.

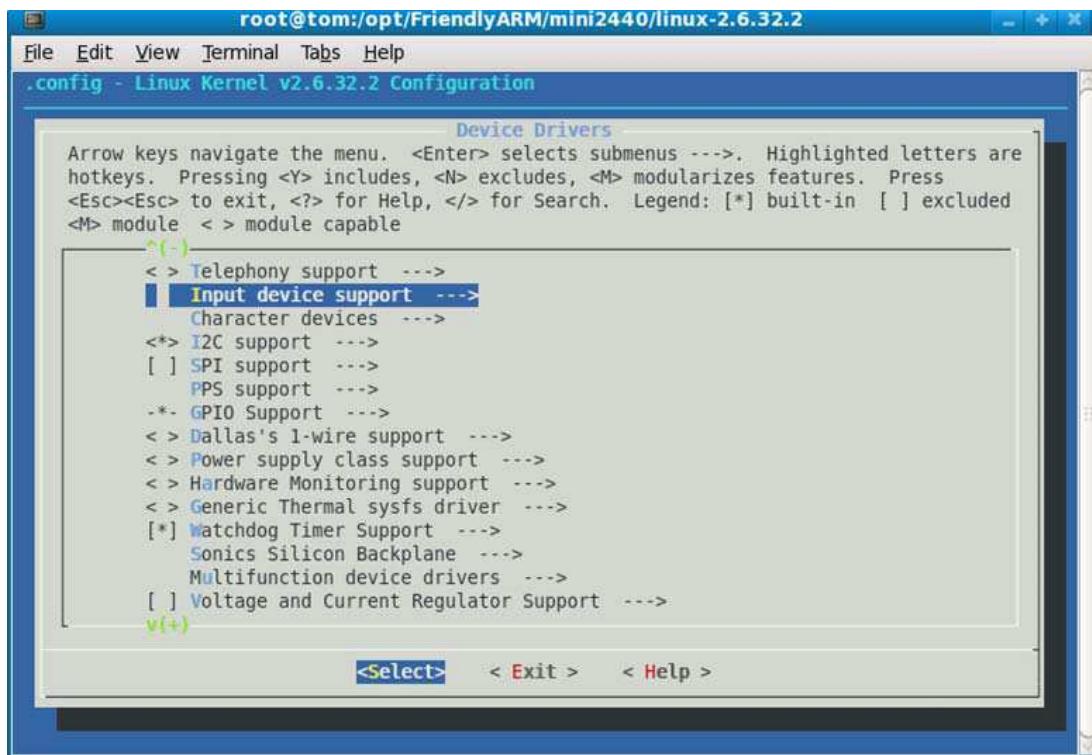


Selection is completed, has been tips by the bottom of the configuration menu to return to the Device Drivers.

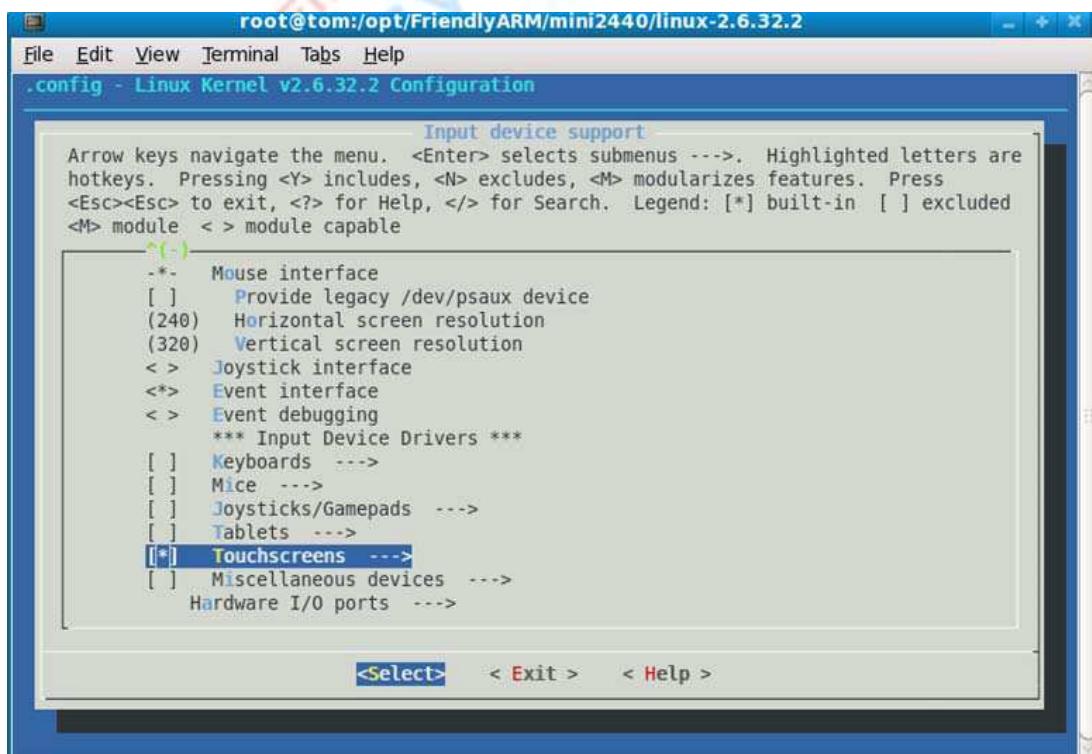
### 6.3.3 Touchscreens

Note: If you choose VGA1024x768 display output module is not configured this entry.

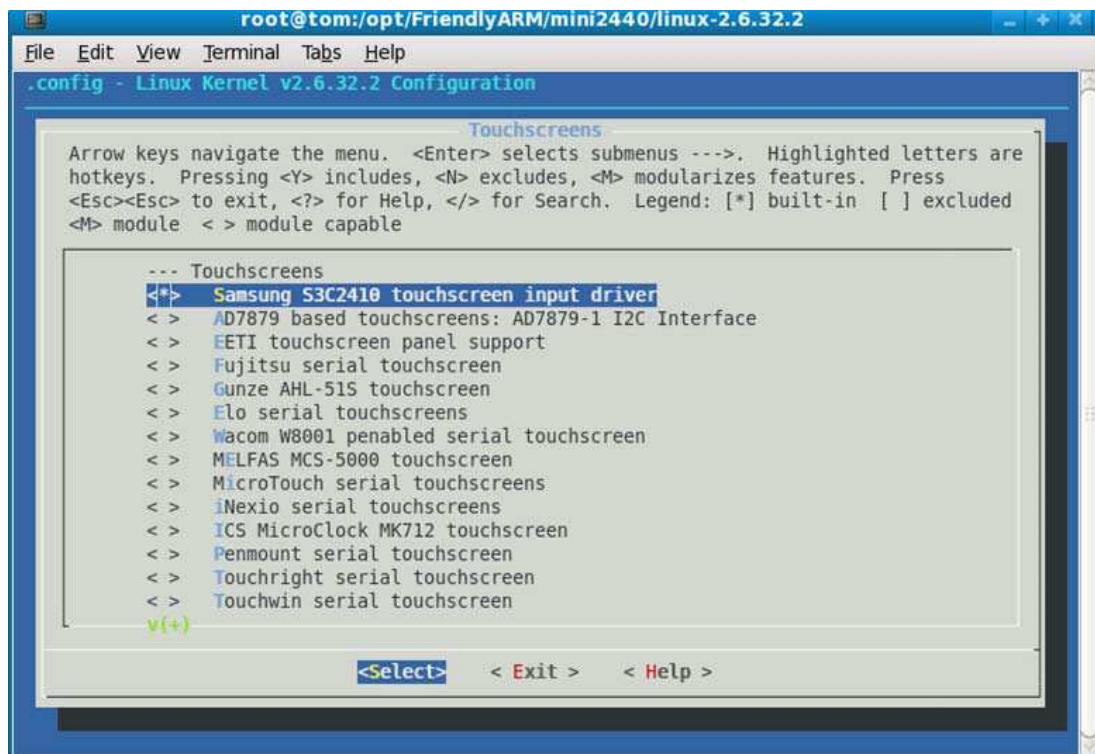
Inside the Device Drivers menu, select Input device support, press enter.



Select Touchscreens option, press enter, as shown:



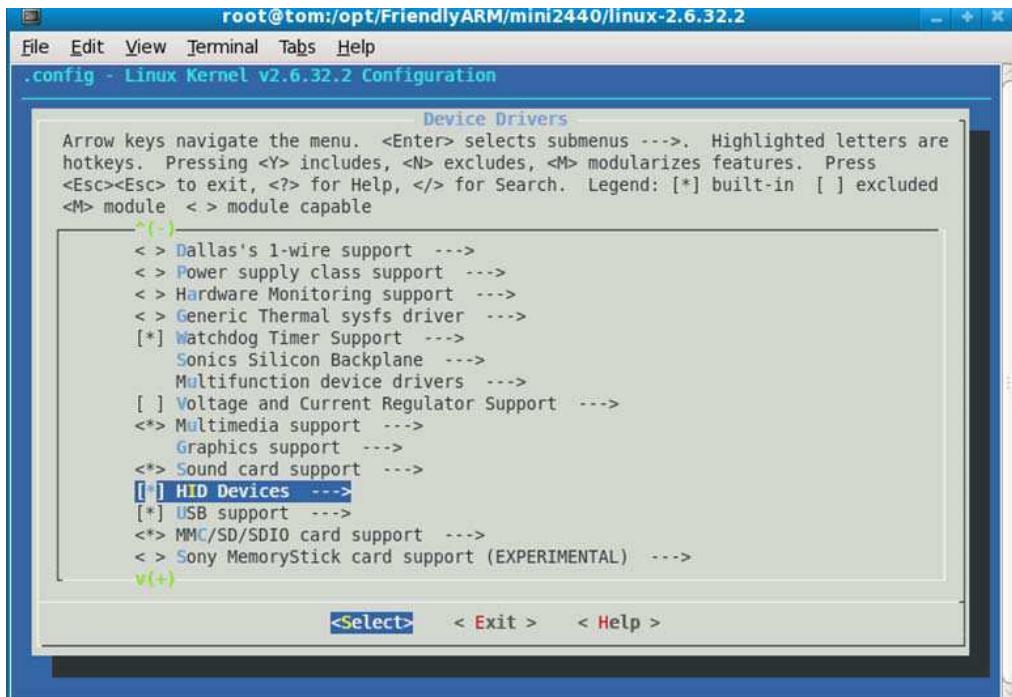
Then select shown in figure.



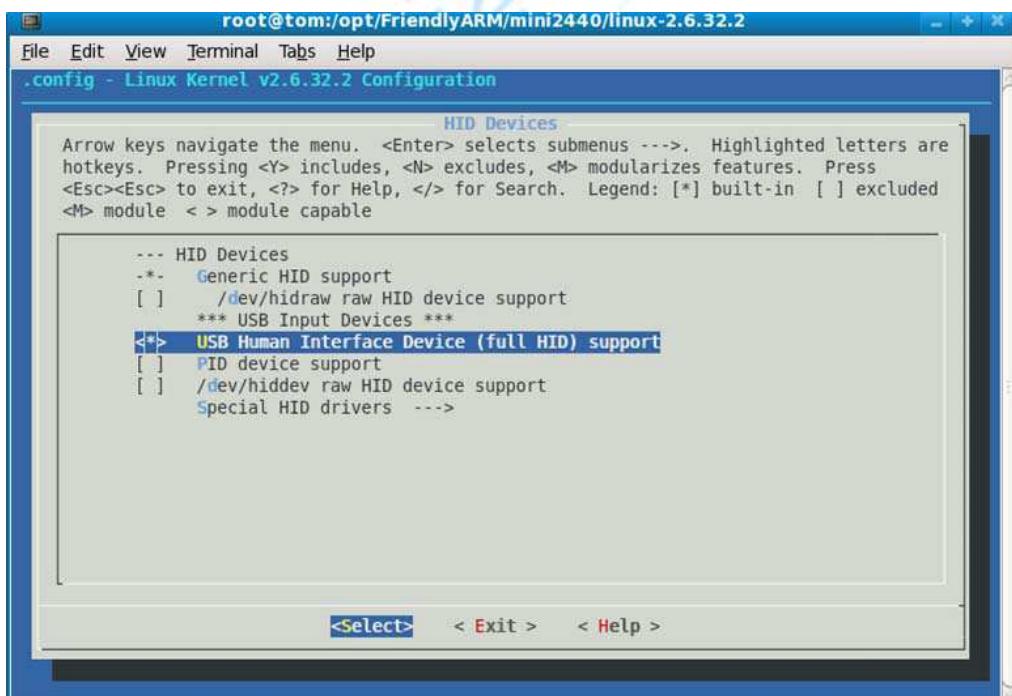
Selection is completed, has been to return by <Exit> Device Drivers menu.

### 6.3.4 USB mouse and keyboard configuration

Inside the Device Drivers menu, find the shown in figure option, and select.



Select the shown "<\*>" is indicated by the option.



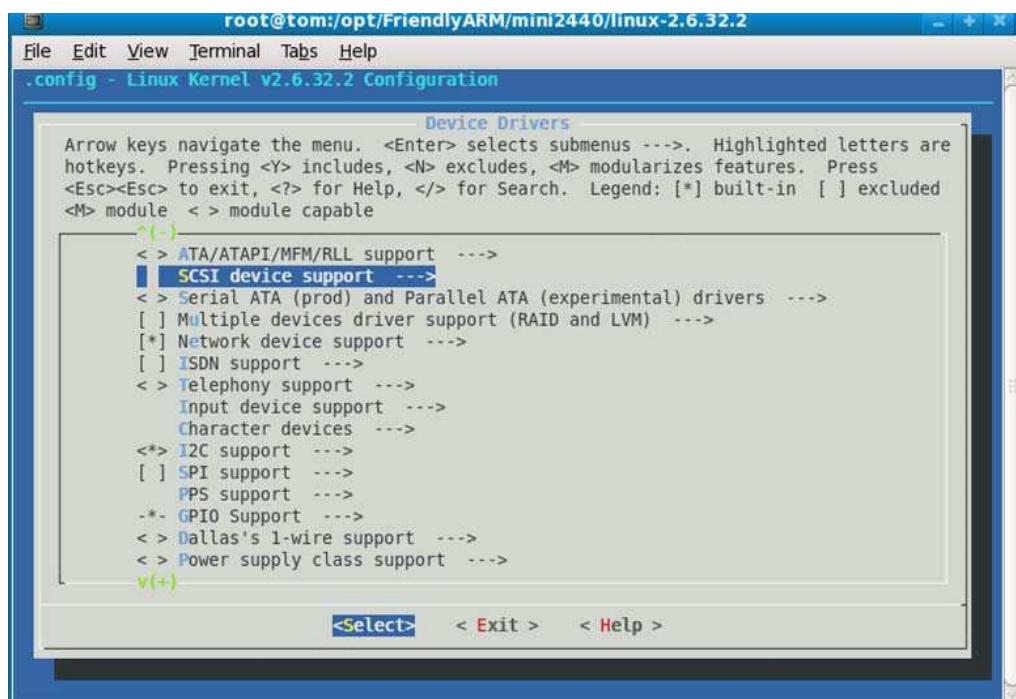
This configuration on the choice of a USB keyboard and mouse (Human Interface

Device: HID), then select <Exit> to return Deice Drivers menu.

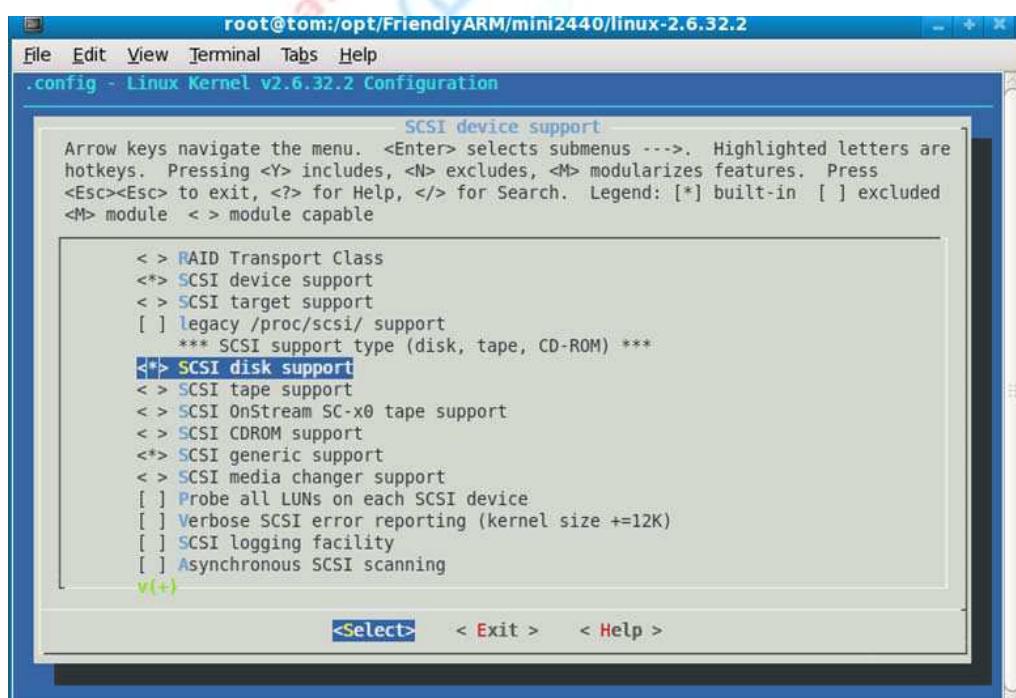
### 6.3.5 USB support configuration

Because USB uses the SCSI command, so let's add SCSI support.

Inside the Device Drivers menu, select the SCSI device support, press enter.

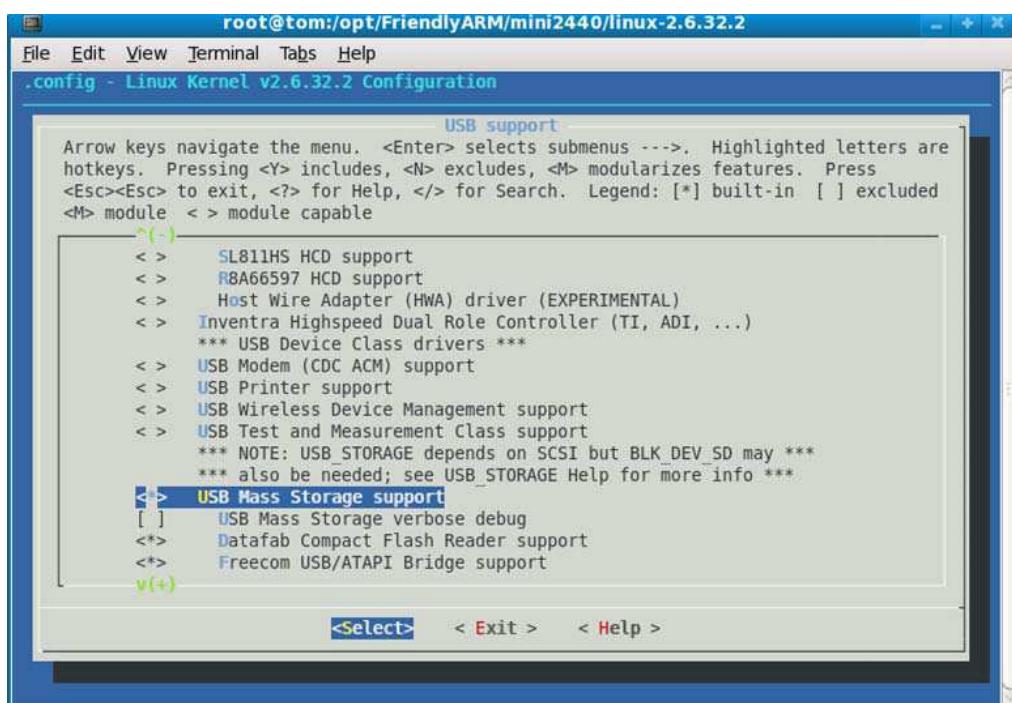


In the sub-menu, select as shown in figure.



To return Device Drivers menu, then select USB support, USB support press enter menu to find and select (by press spacebar).

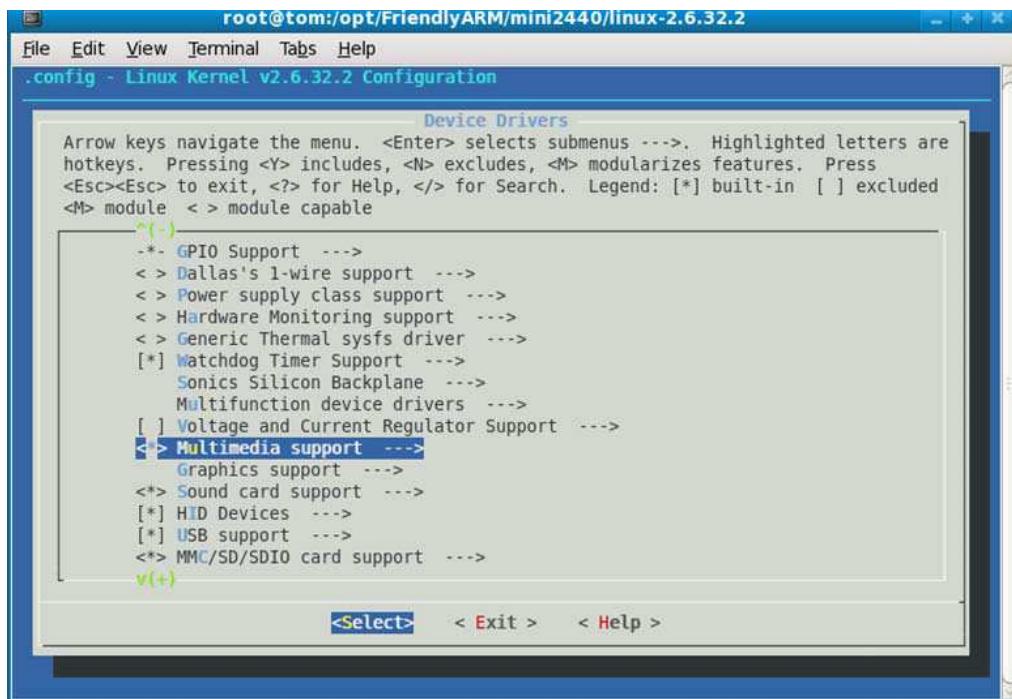
<\*> USB Mass Storage support



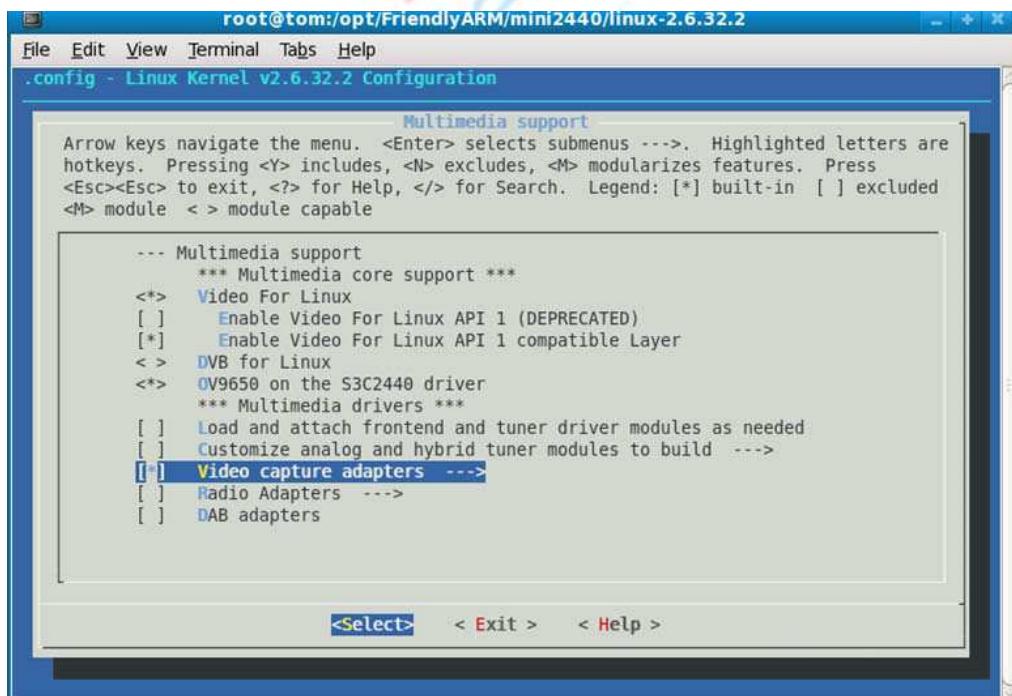
Then select the Device Drivers menu <Exit> to return

### 6.3.6 Configure USB camera driver

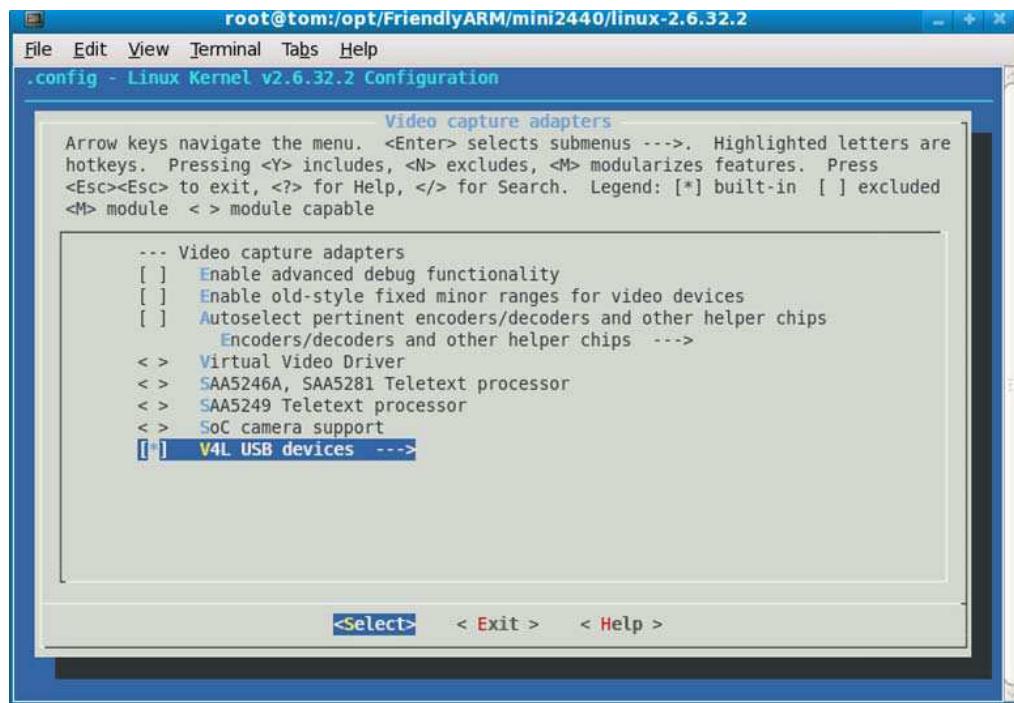
Inside the Device Drivers menu, select the Multimedia support devices; press enter.



Select the as shown in figure with "<\*>" option, and choose the Video capture adapters

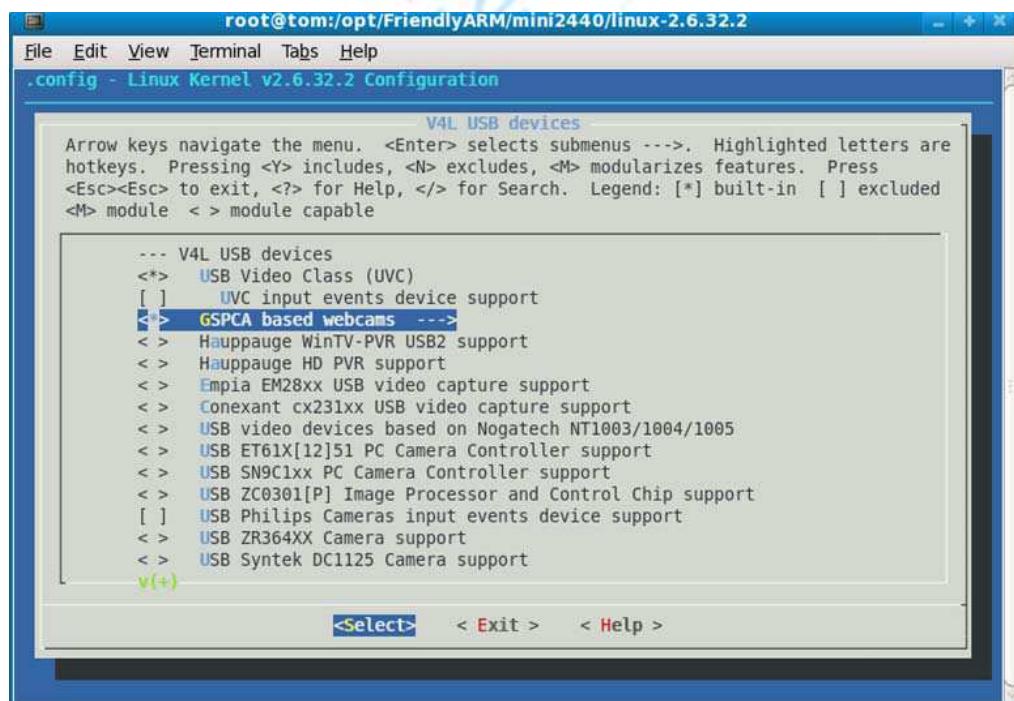


Appear in figure menu, find the option and enter as shown in figure.



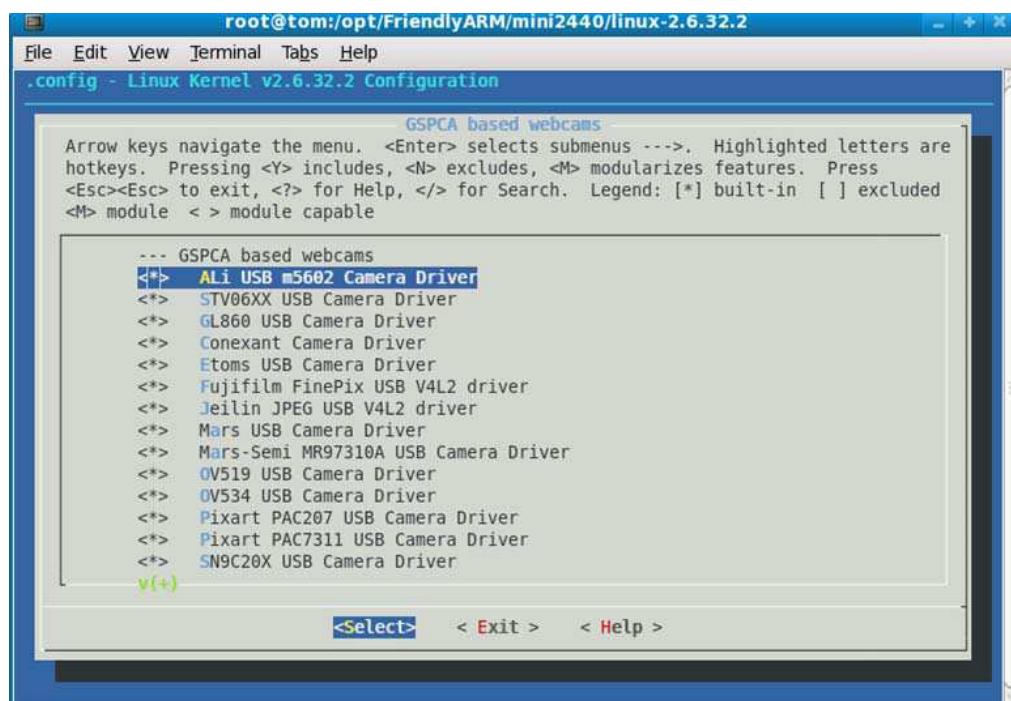
Appear in figure menu, select as shown in figure "<\*>" number option, then select

GSPCA based webcams.



GSPCA is a French programmer in his spare time making a universal USB camera driver, where you can select all types of USB camera support, as shown in figure

Note: Although there are many camera driver version for you to select, but each model is not identical to the Video output format, which requires high-level applications handled separately according to the actual circumstances, order to correctly use these drivers.

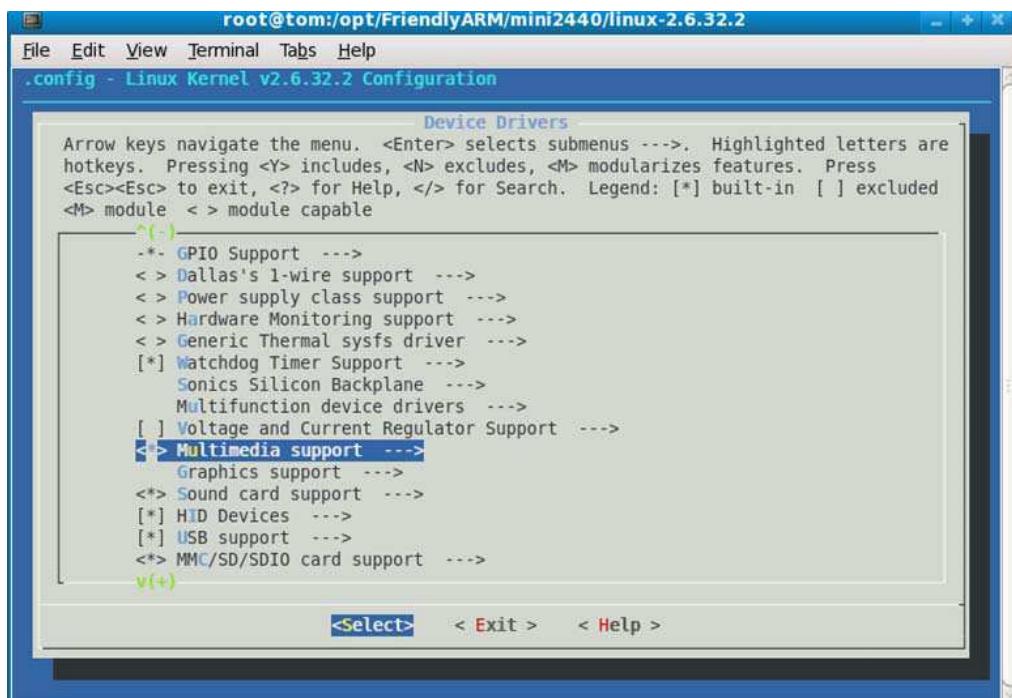


Select <Exit> return to the Device Drivers menu, and then select <Exit> return to the main menu.

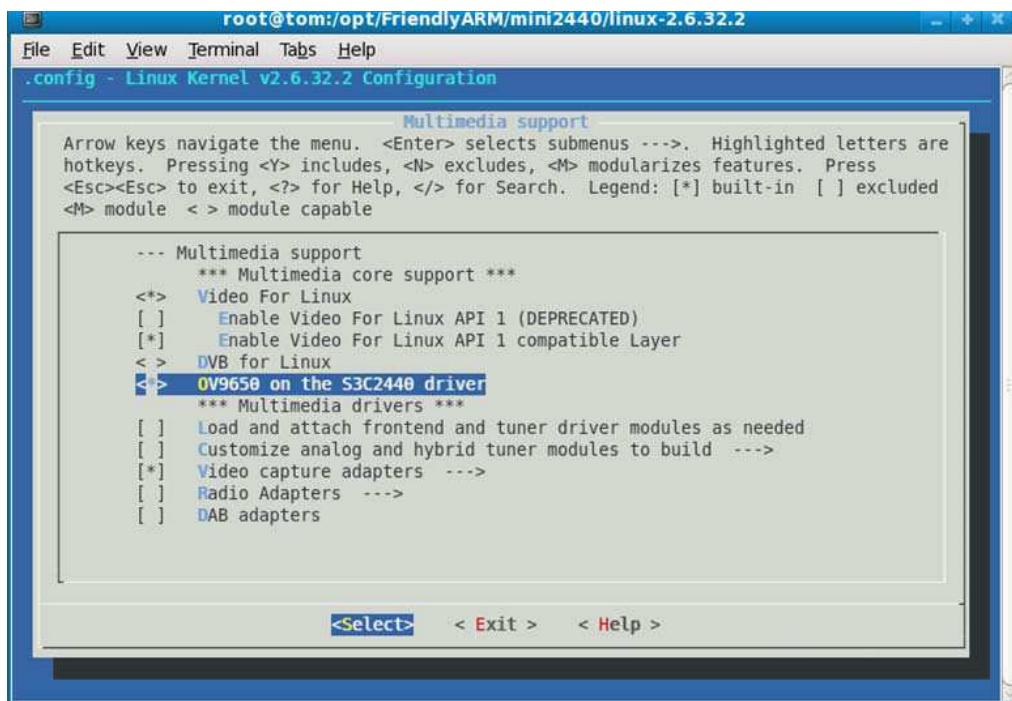
### 6.3.7 Configuration CMOS camera driver

The development board with used CMOS camera module CAM130, the internal use of OV9650 chip, so we need to do to configure the driver, the following steps:

Inside the Device Drivers menu, select the Multimedia devices press enter.



Select the as shown in figure with "<\*>" option, and select the Video capture adapters, find the OV9650 chip drive and select it, as shown:

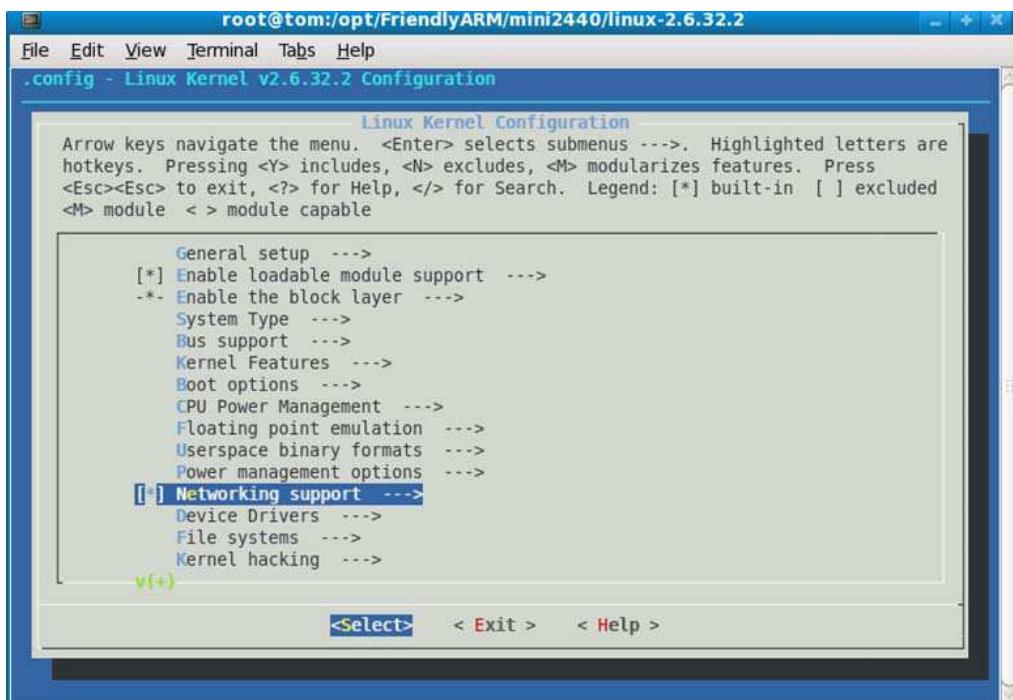


Note: CAM130 module design driver, neither VL4 system, does not belong to V4L2 system; it is a simple character device, so in order to facilitate migration.

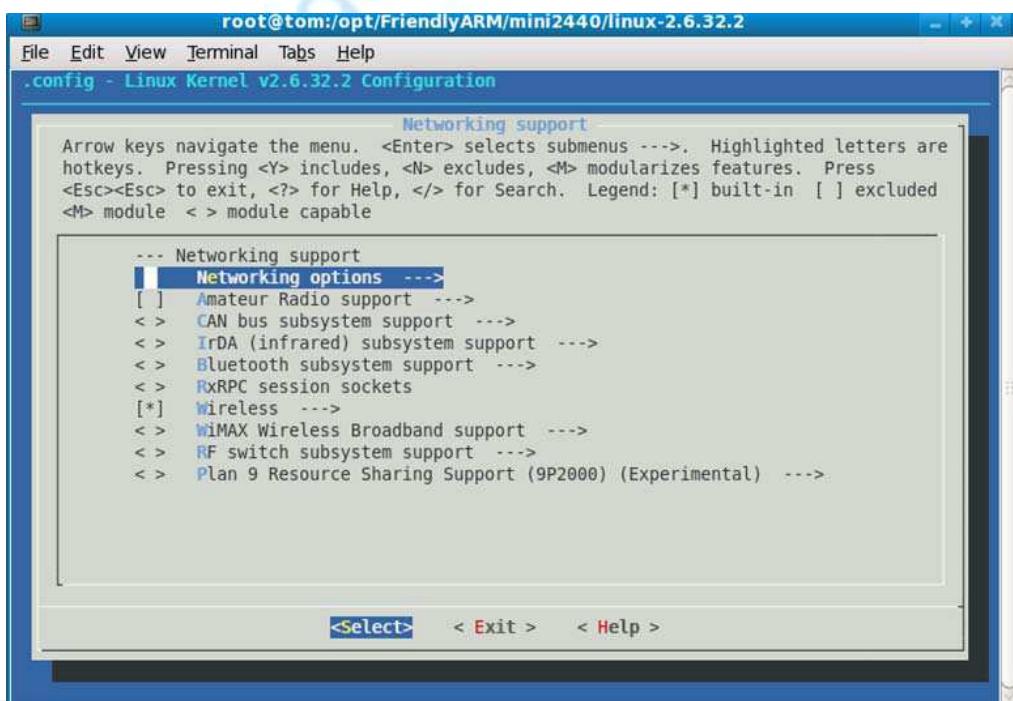
### 6.3.8 Network card driver configuration

To configure the network card driver, first configure the network protocol support.

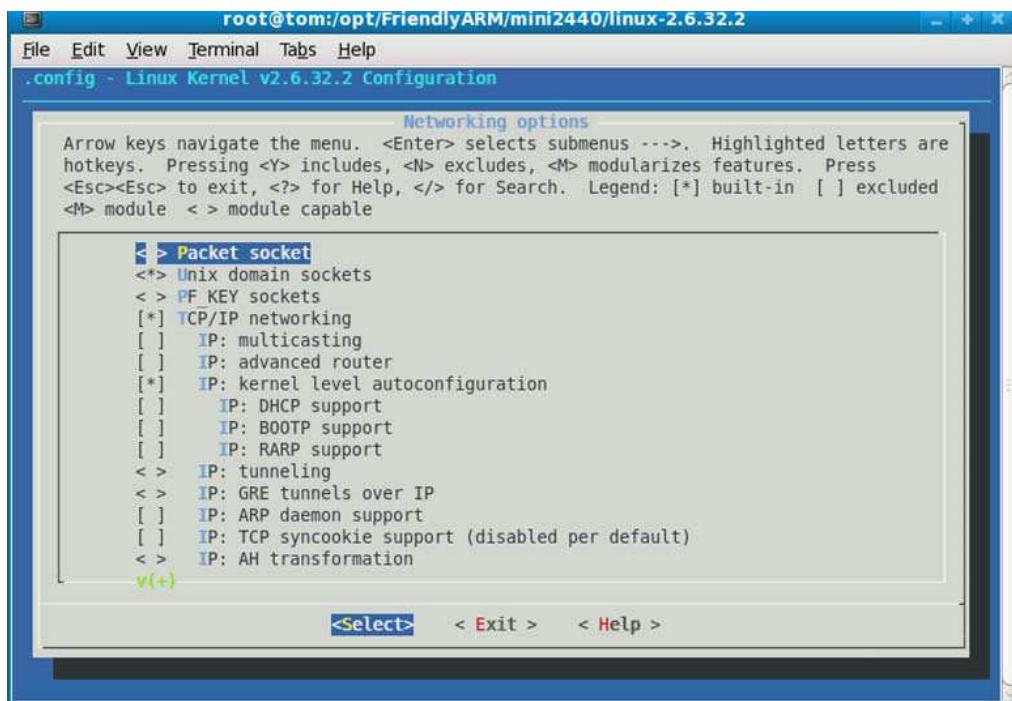
In the main menu, select Networking support, press enter.



Appear in figure submenu, as shown in figure select the “Networking options” and enter.

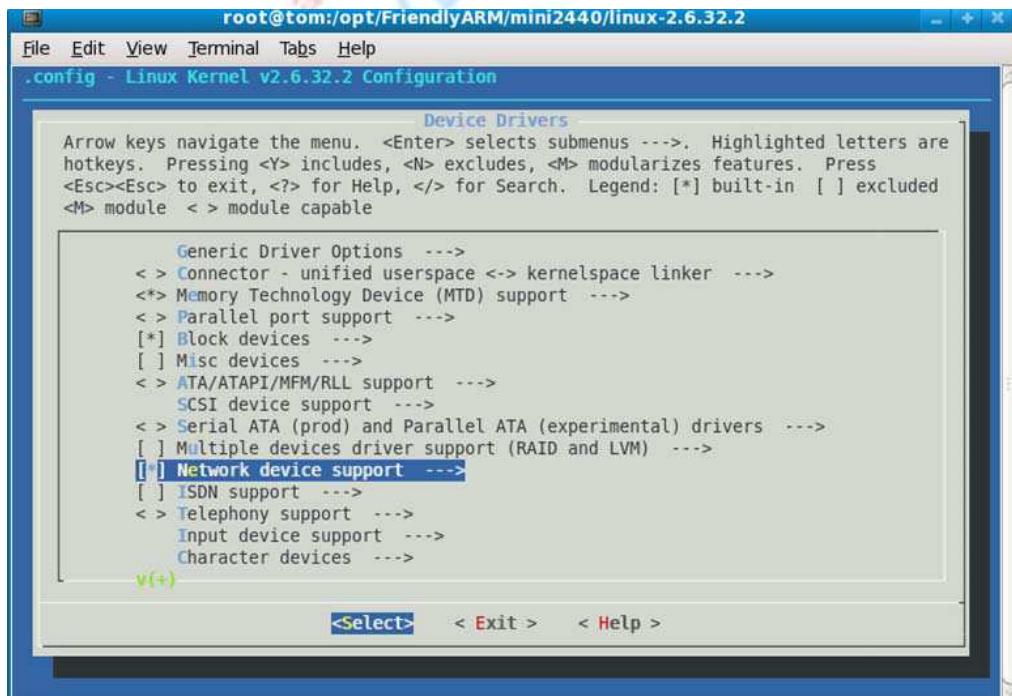


General we select the TCP/IP networking protocol is enough, but we recommend using the default configuration of several options, as shown in figure.

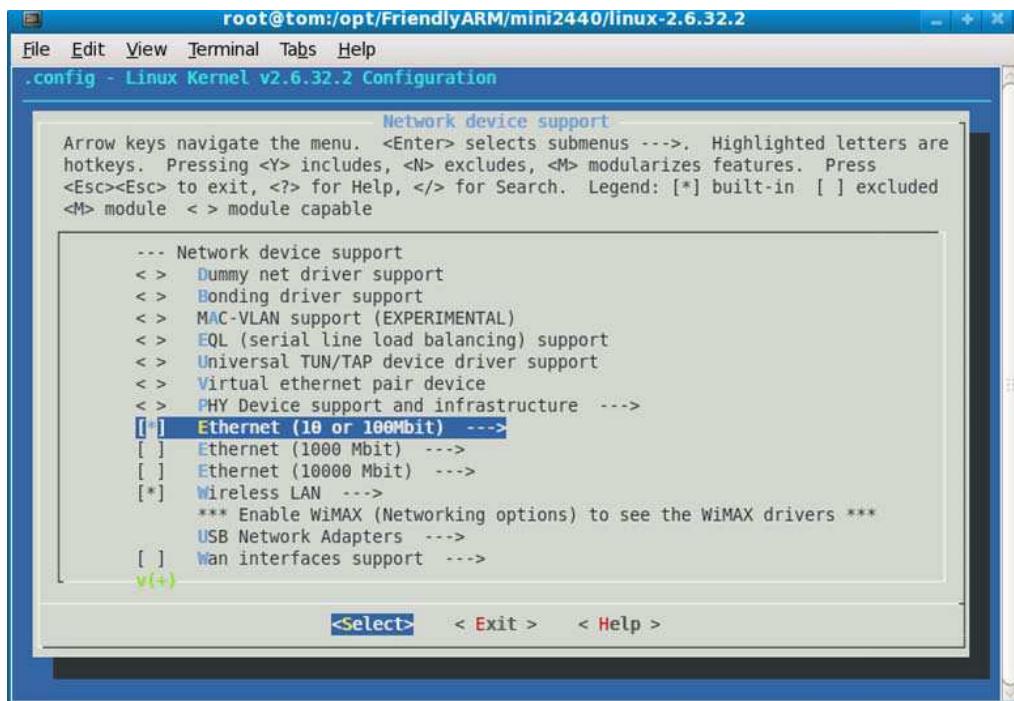


Selection is completed, return to the main menu, and enter Device Drivers menu.

Find "Network device support", select to enter.



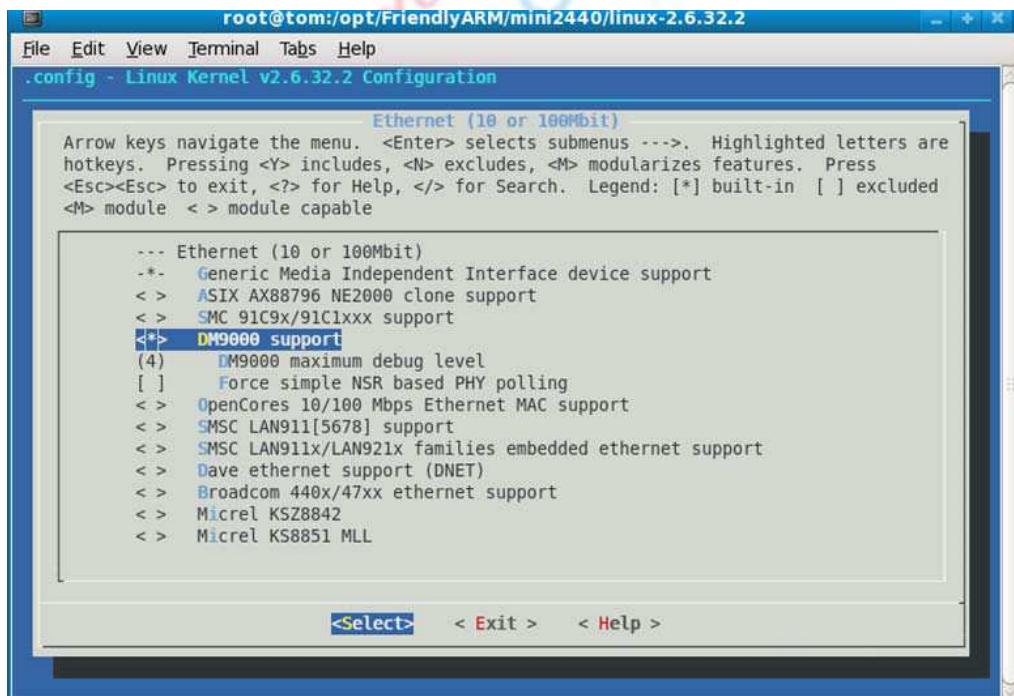
Find and access "Ethernet (10 or 100Mbit)" options.



Select:

<\*> Generic Media Independent Interface device support

<\*> DM9000 support

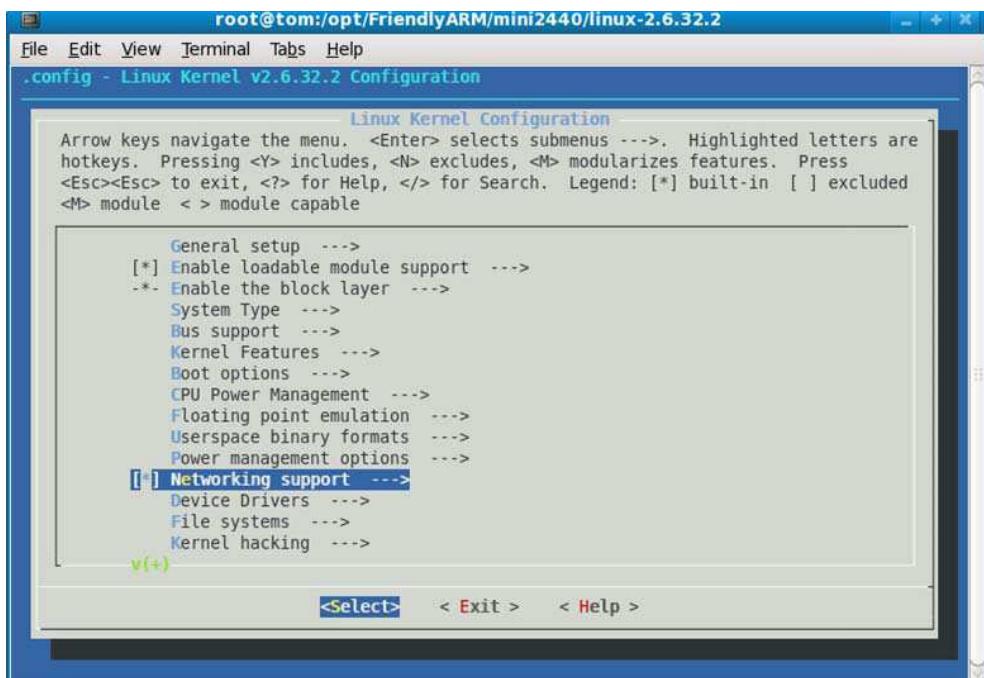


Select <Exit> for return to the Device Drivers menu.

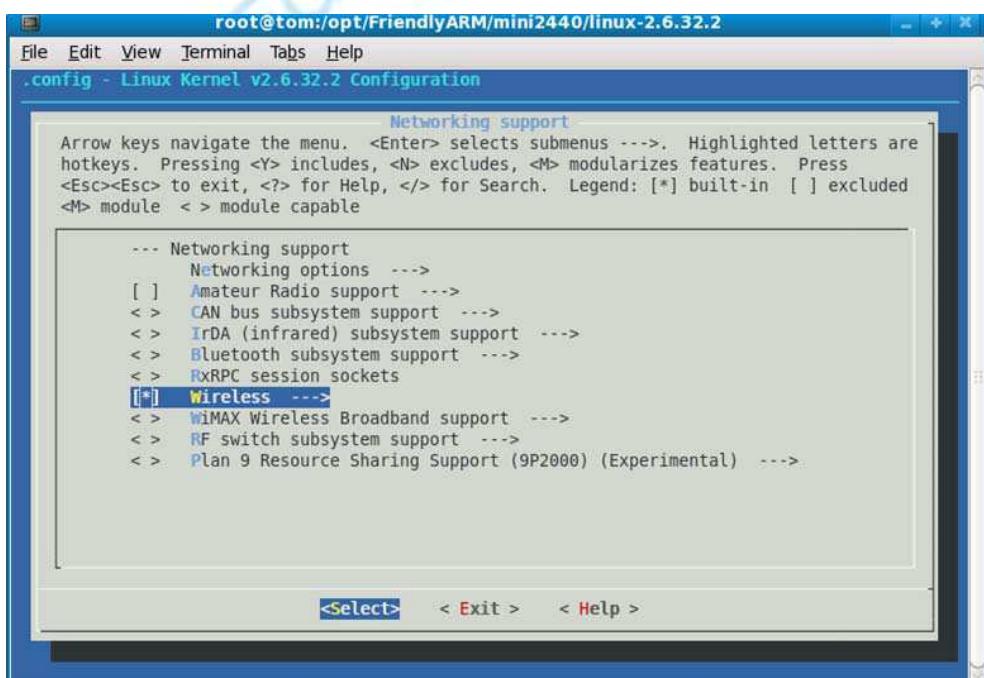
### 6.3.9 Configuring the USB Wireless LAN Driver

The development board uses linux-2.6.32.2 kernel, which already contains a variety of types of USB wireless network card driver, we have the default configuration and have a lot card types, as TP-Link series, VIA series, the following description of its driver configuration.

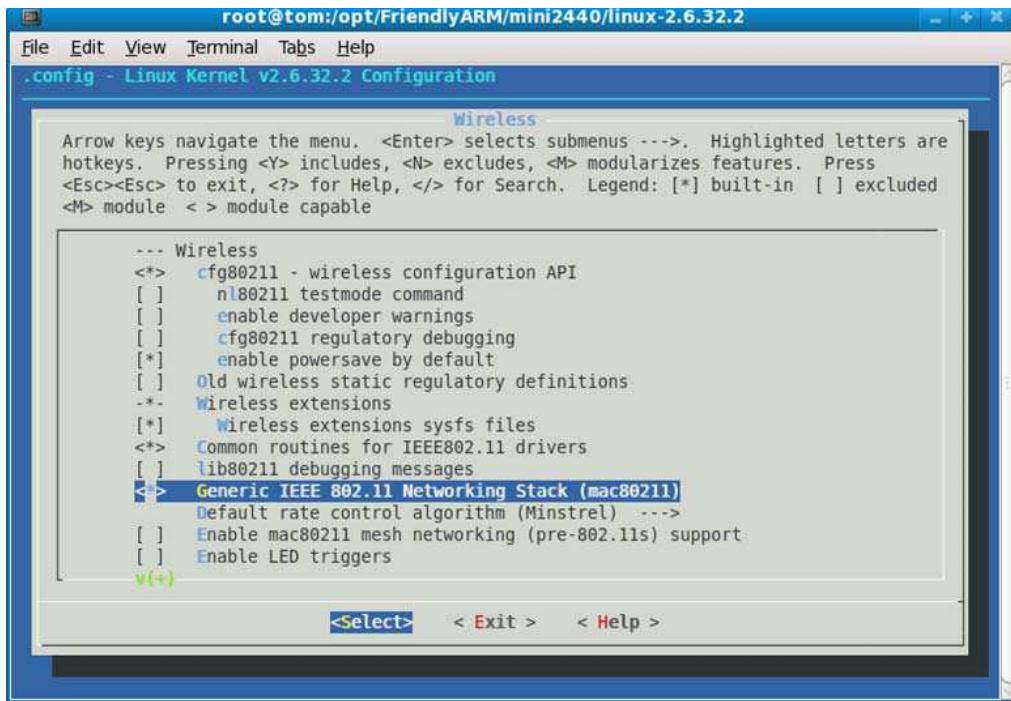
In the main menu, select Networking support, enter.



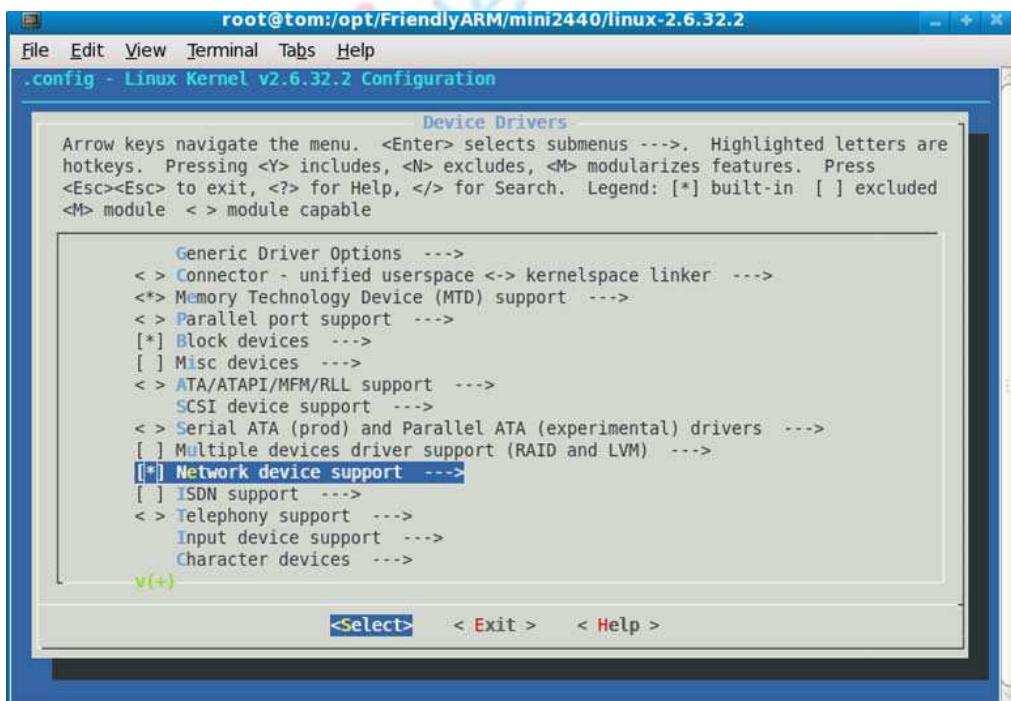
Appear in figure submenu, as shown in figure select “Wireless” and enter the start configuring the wireless network protocol.



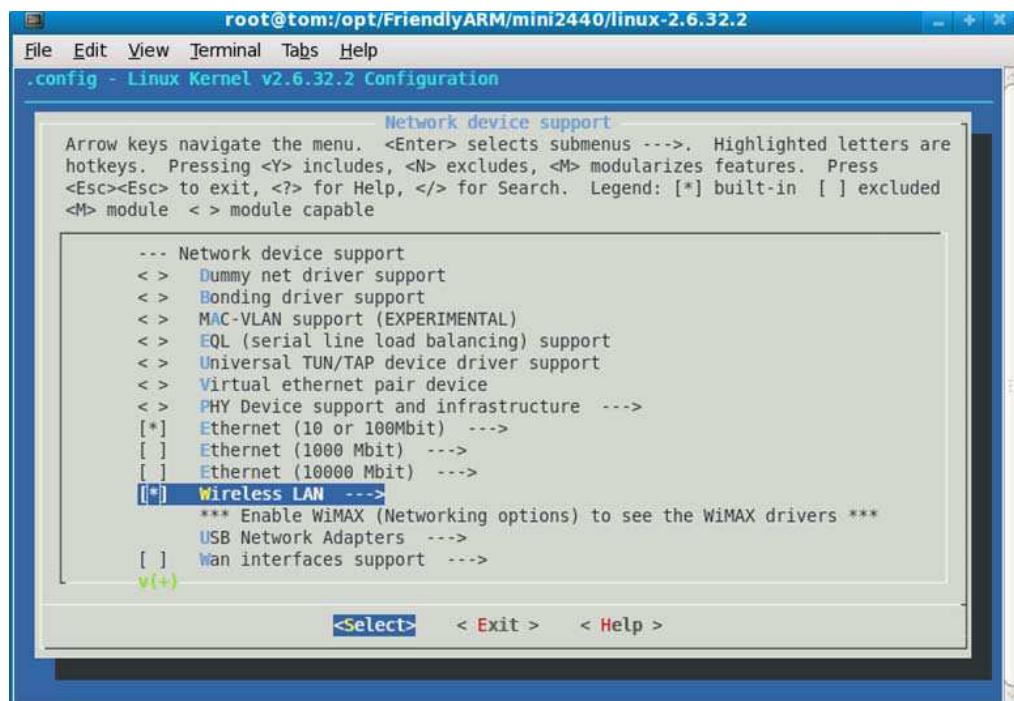
Select the configuration as shown “<\*>” in figure:



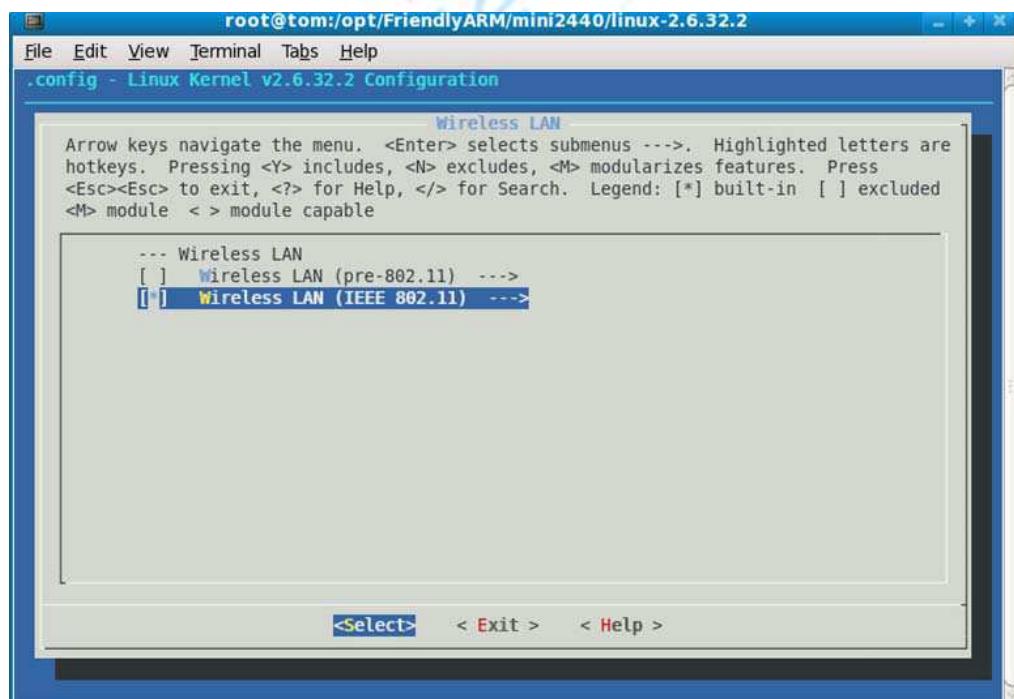
Return to the kernel configuration main menu, select Device Drivers and enter to begin configuring the wireless network card driver, as shown in figure.



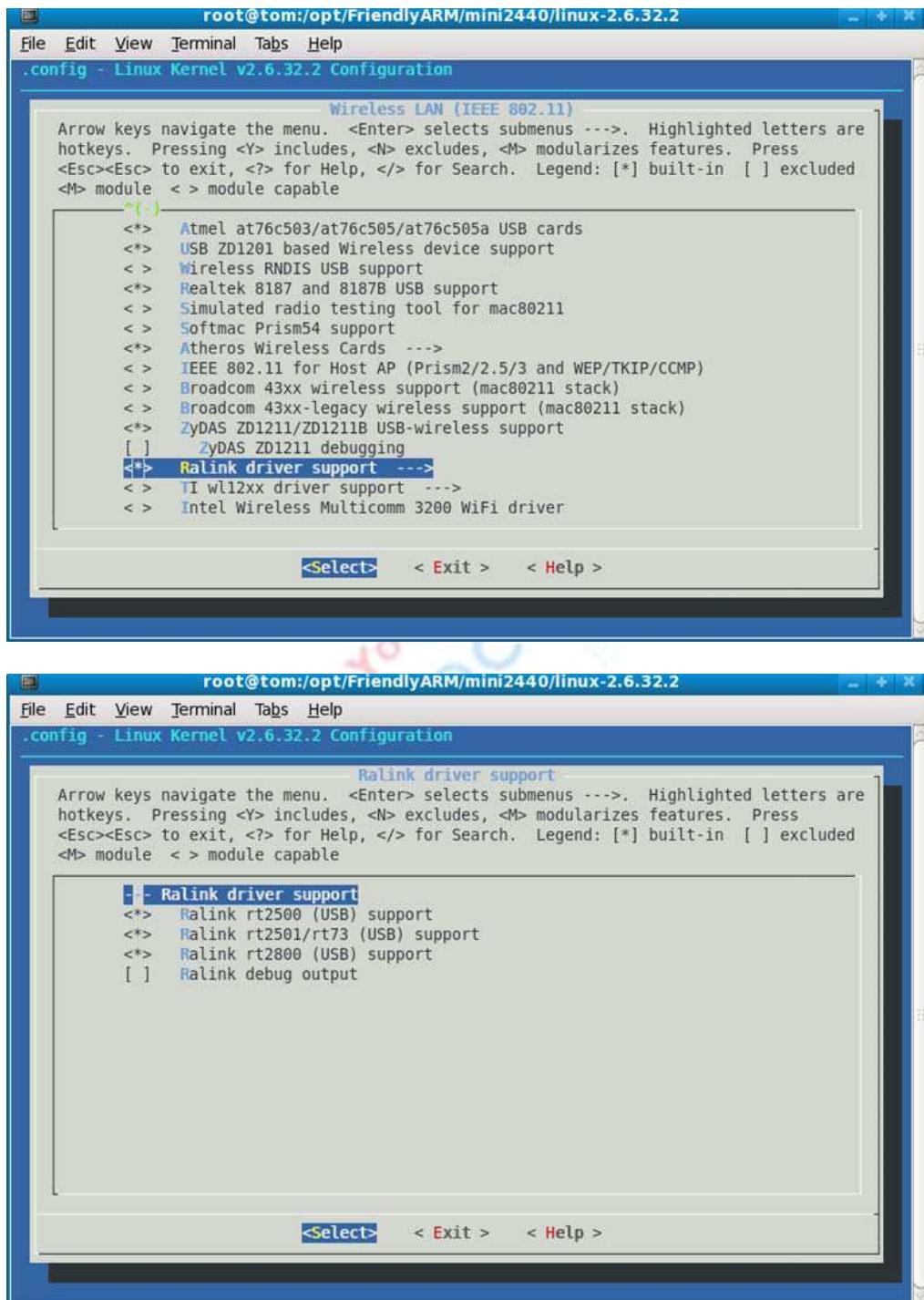
Access network device sub-menu, find the sub key as shown in figure wireless network equipment, and enter.



Then select the "Wireless LAN (IEEE 802.11)" sub key, and enter.



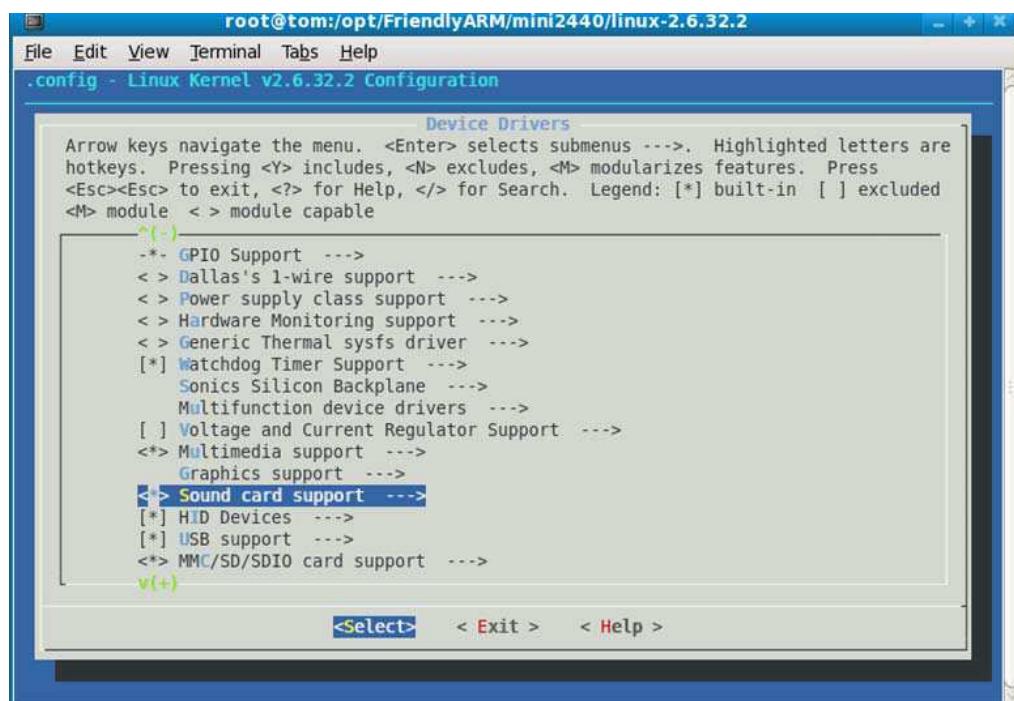
The chip manufacturers has been configured for the classification of t variety of the USB without the new network adapter type, as shown in the company for the Ralink chip solutions support the USB Wireless and LAN Driver.



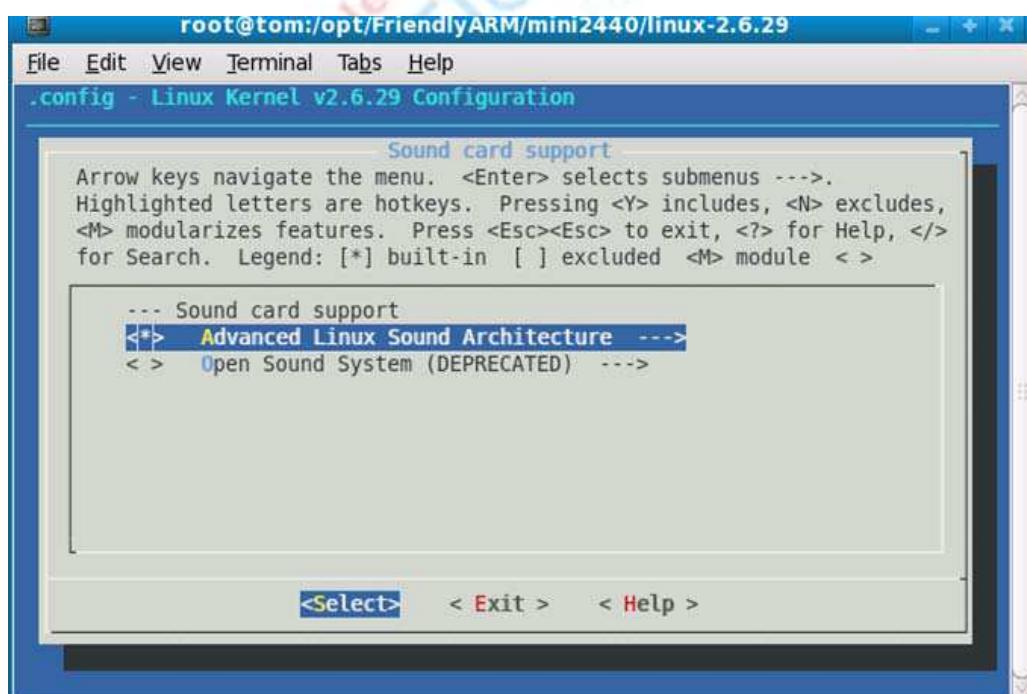
Select <Exit> returned to the Device Drivers menu.

### 6.3.10 Configuring Audio driver

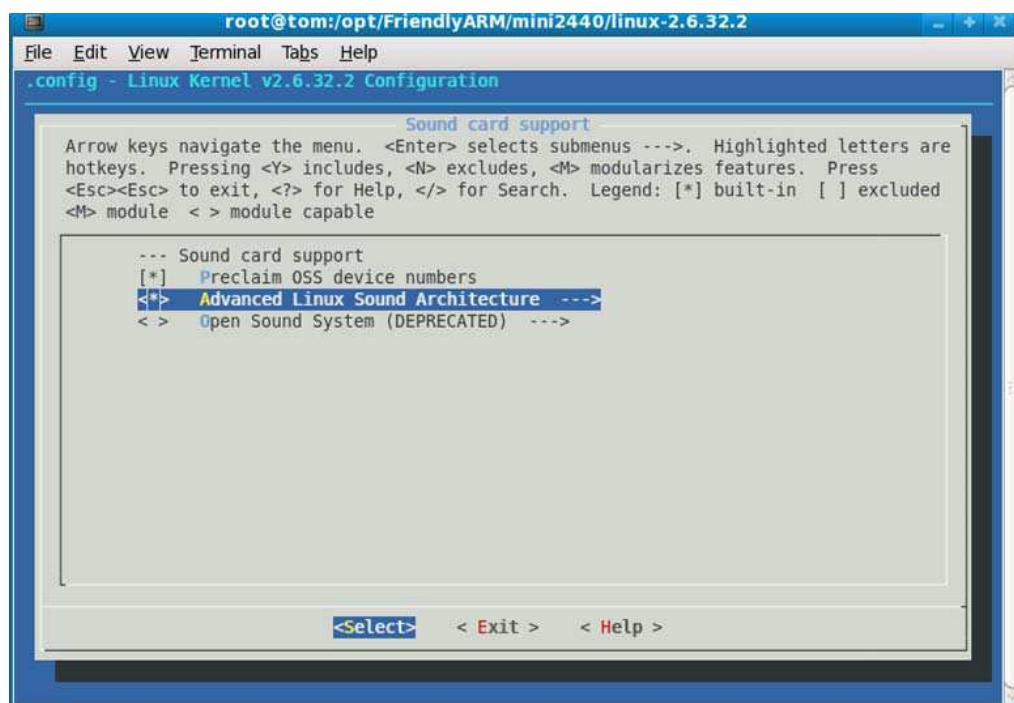
At Device Drivers menu, select Sound card support, and enter.



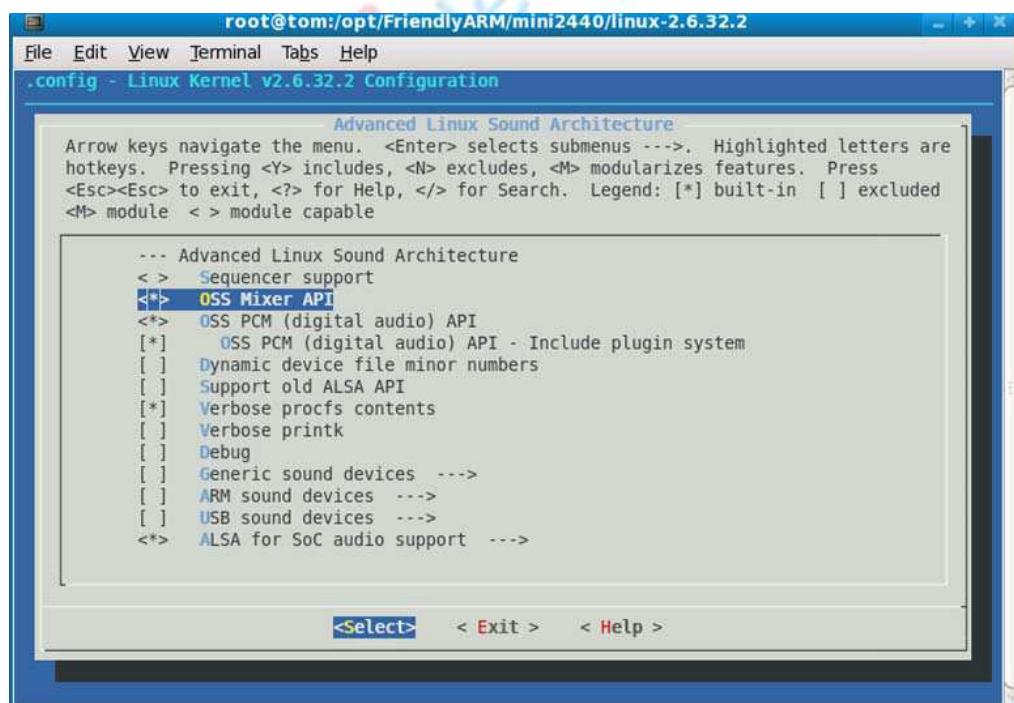
As shown in figure select again, and enter.



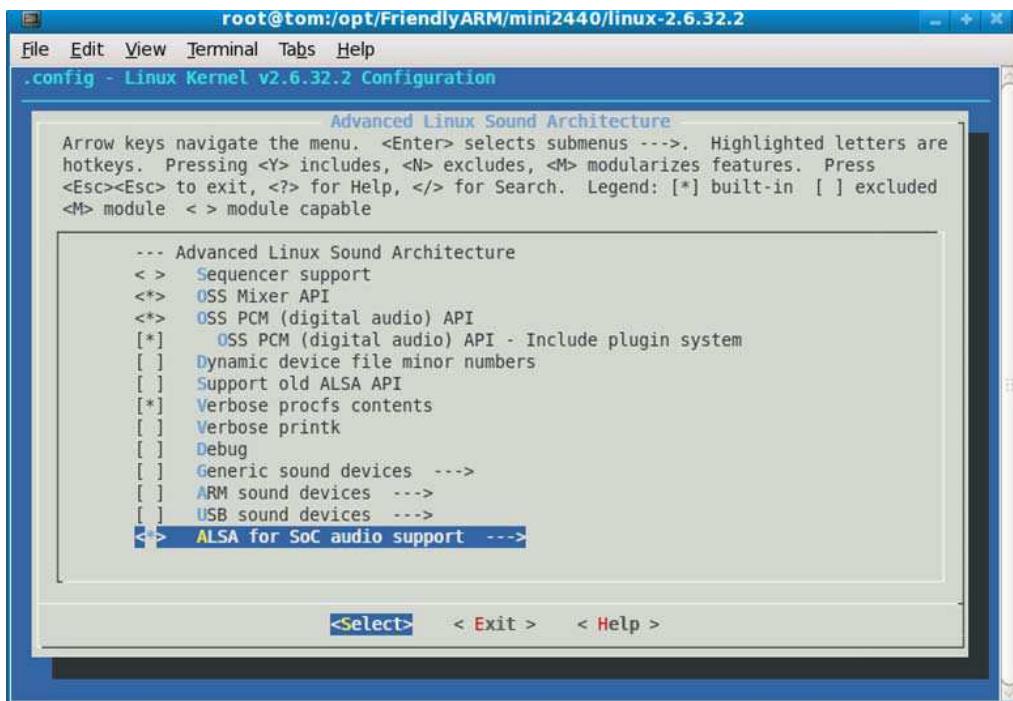
At the menu that appears, select the interface to support ALSA (Advanced Linux Sound Architecture), and enter.



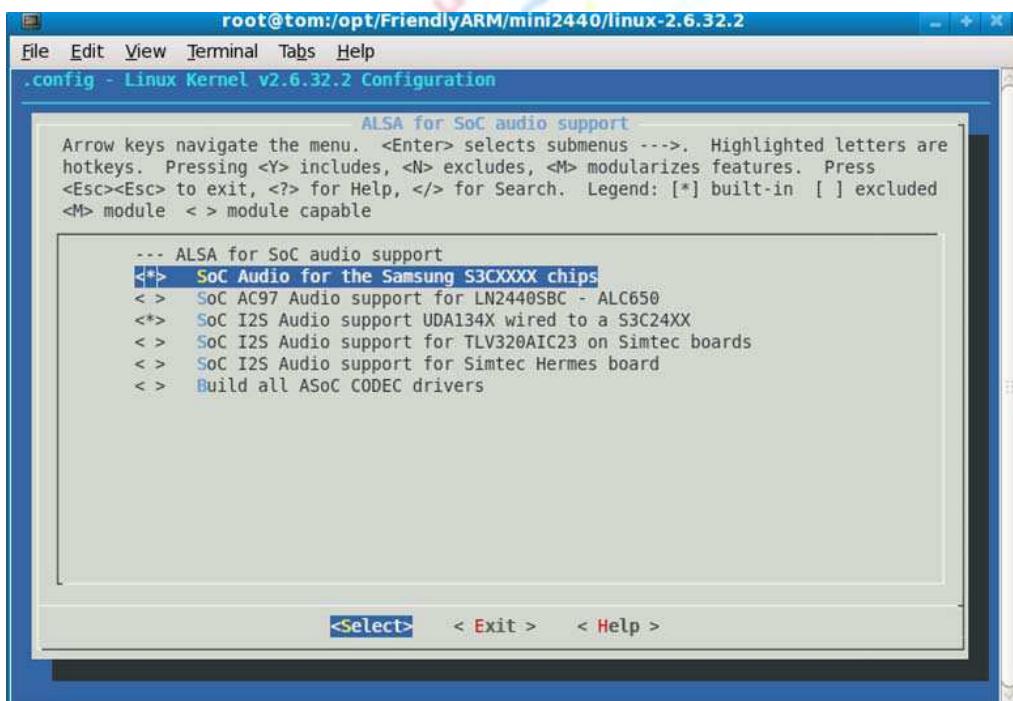
Selection OSS Mixer API to add support for older OSS API, as shown in figure.



Select ALSA for SoC audio support, and access.



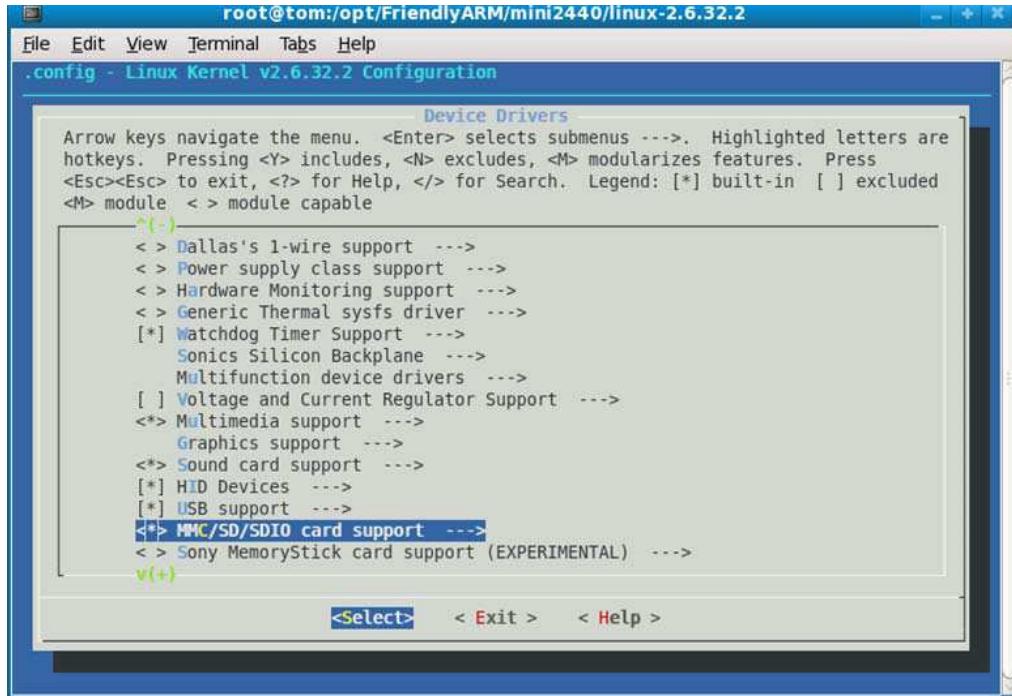
Selection ALSA interface driver support, as shown in figure.



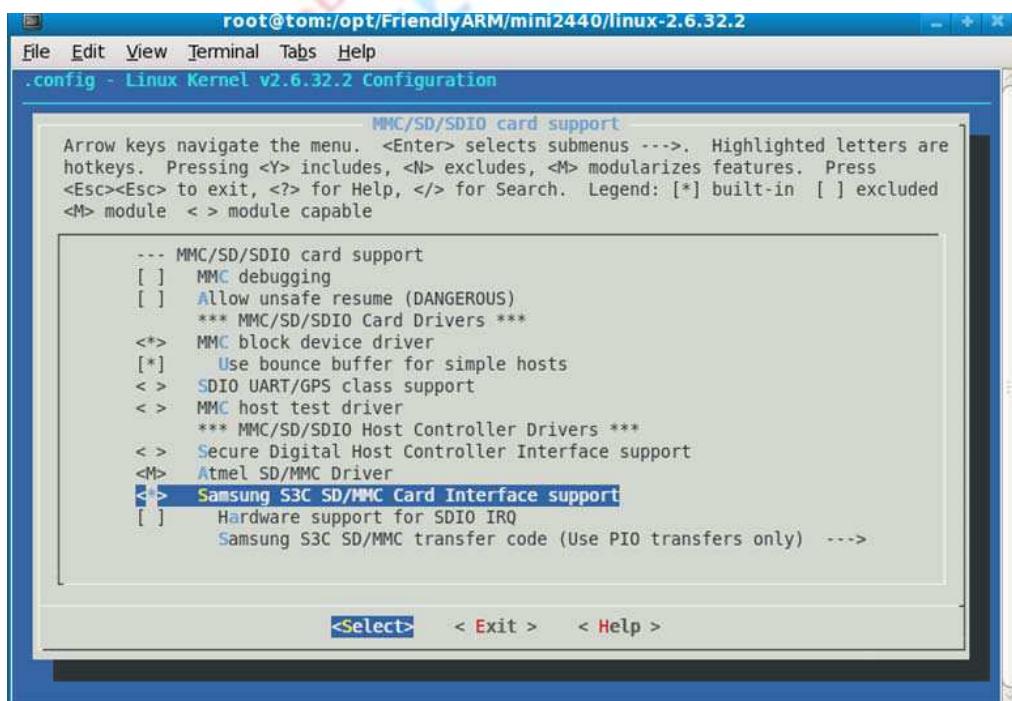
Selection is completed, click <Exit> returned to the Device Drivers menu.

### 6.3.11 Configuring SD/MMC card driver

At Device Drivers menu, select SD/MMC devices option and press enter to access.



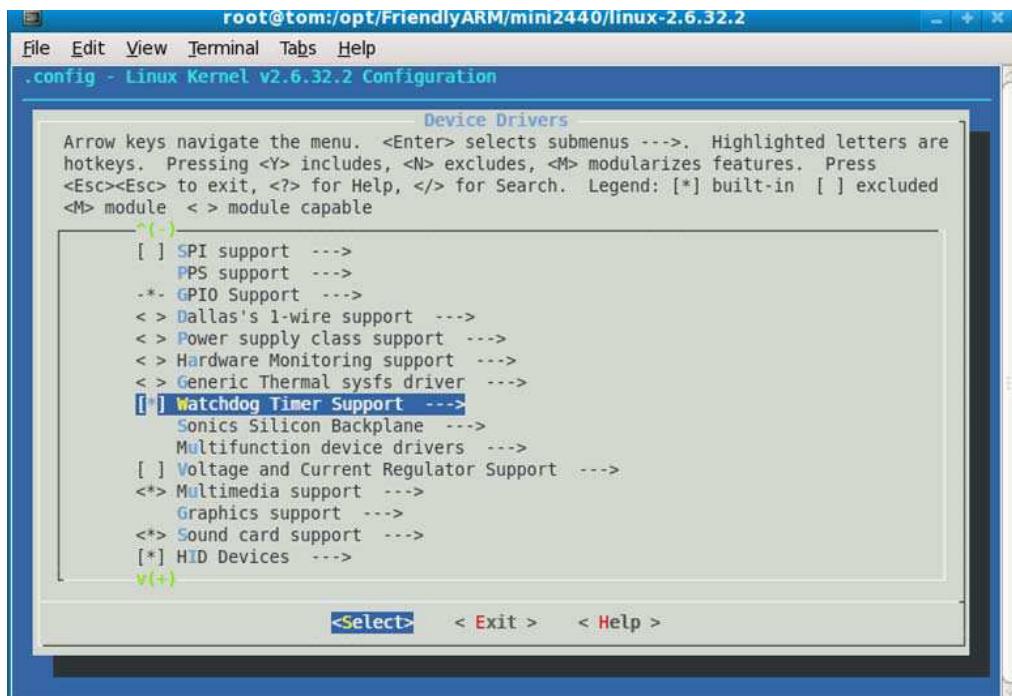
Selection as shown <\*> in the figure, so configured MMC/SD card driver, it can support high-speed large-capacity SD card, the largest up to 32GB.



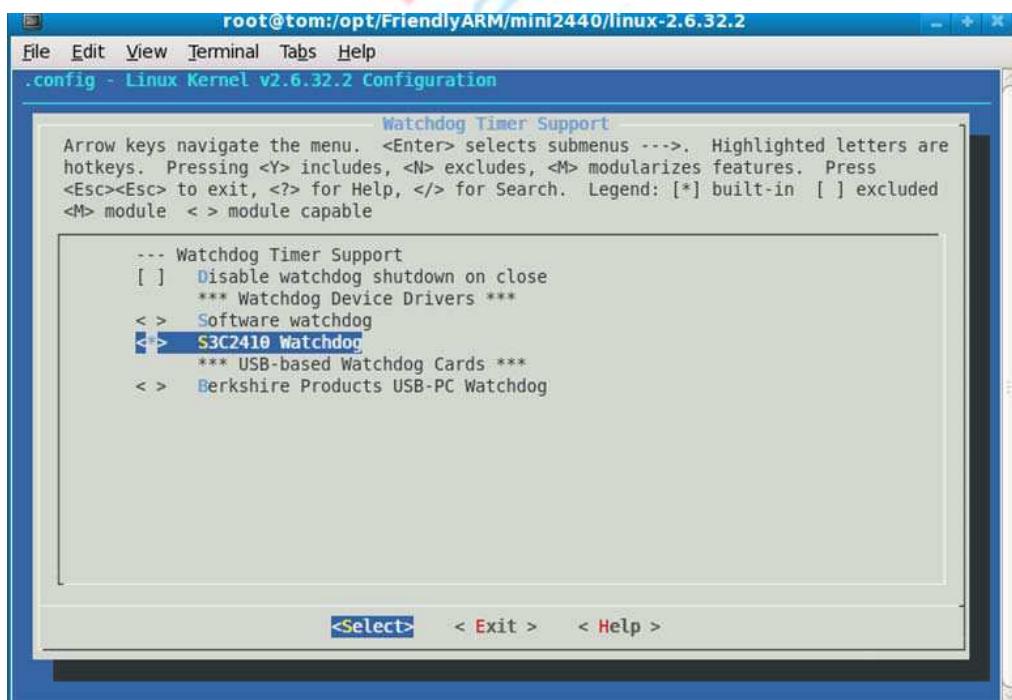
Click <Exit> returned to the Device Drivers menu.

### 6.3.12 Configuring Watchdog driver

In the Device Drivers menu, select watchdog option and press enter into.



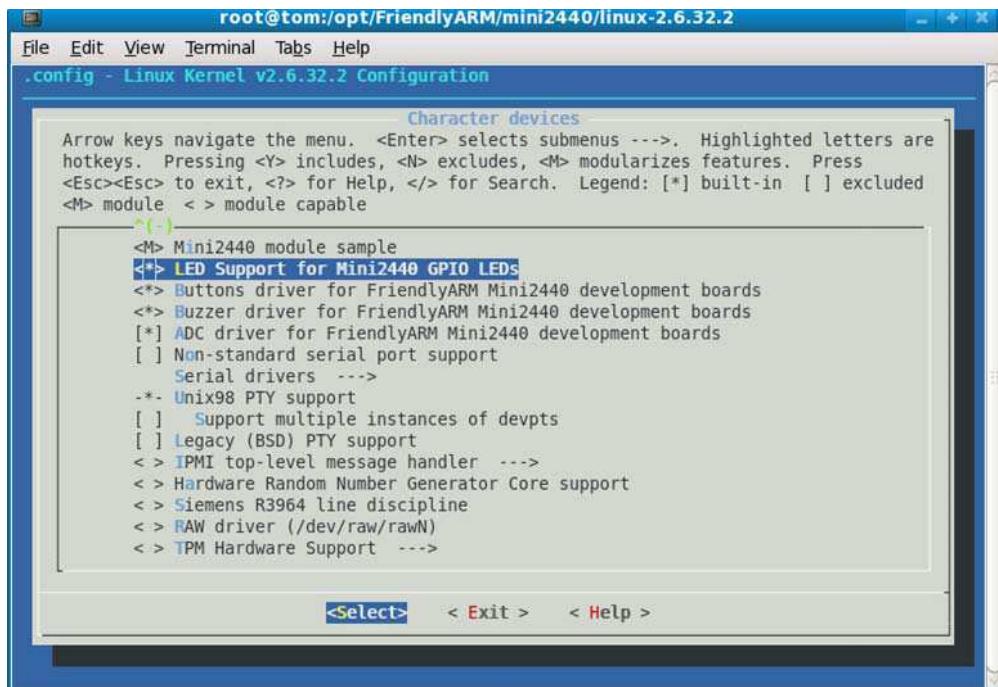
Watchdog driver support is select as shown.



Click <Exit> return to the Device Drivers menu.

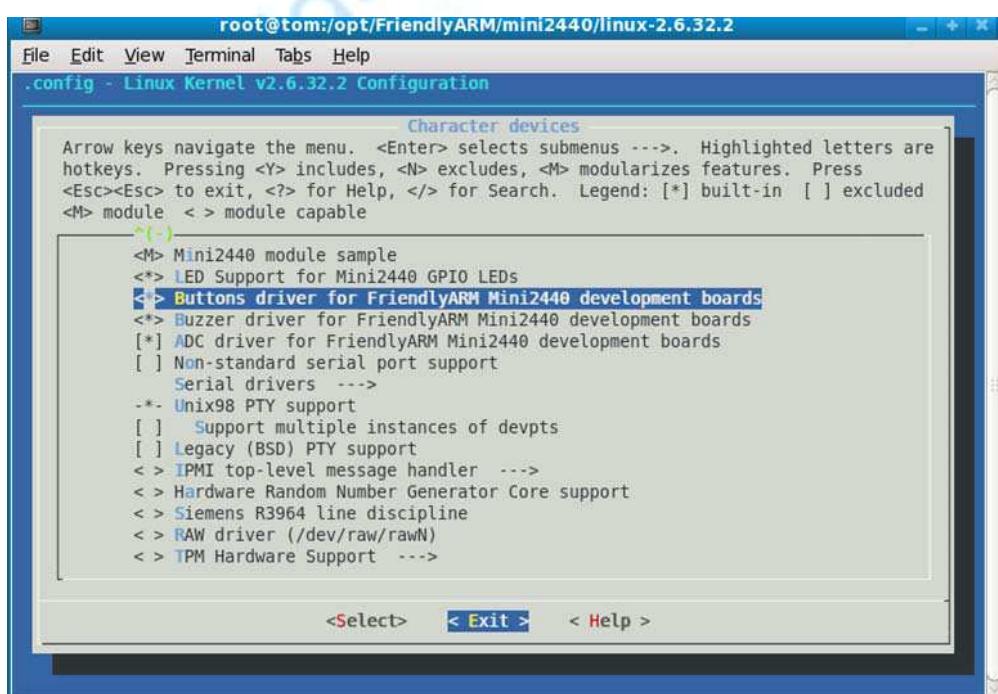
### 6.3.13 Configuring LED driver

At Device Drivers menu, select to enter the Character devices, find and select the LEDs driver support, as shown.



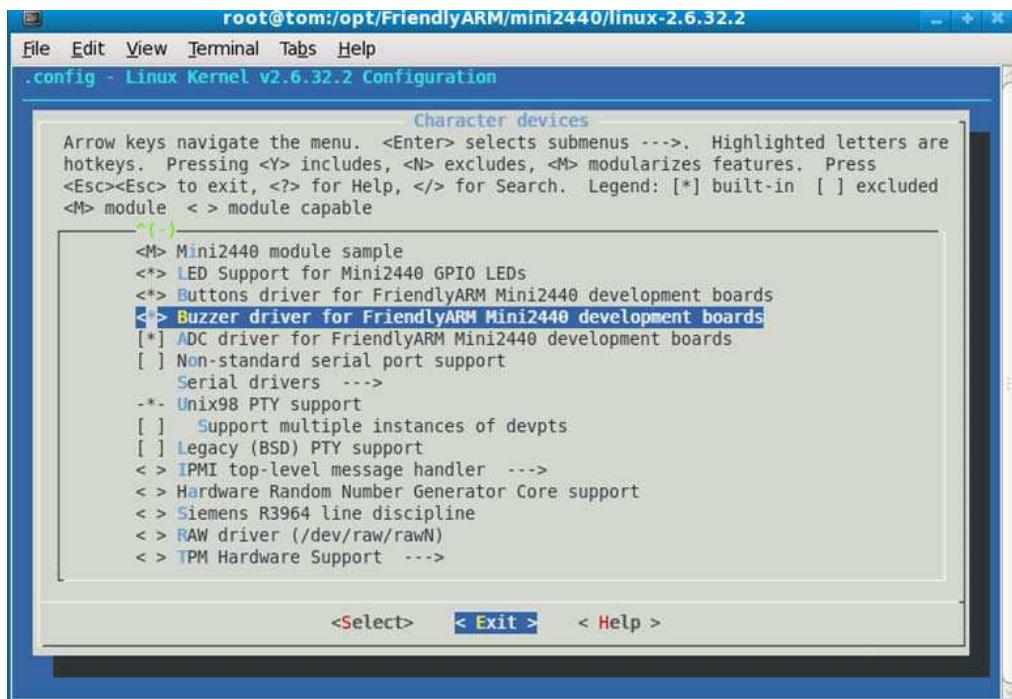
### 6.3.14 Configuring Button driver

At Device Drivers menu, select to enter the Character devices, find and select the Buttons driver support, as shown.



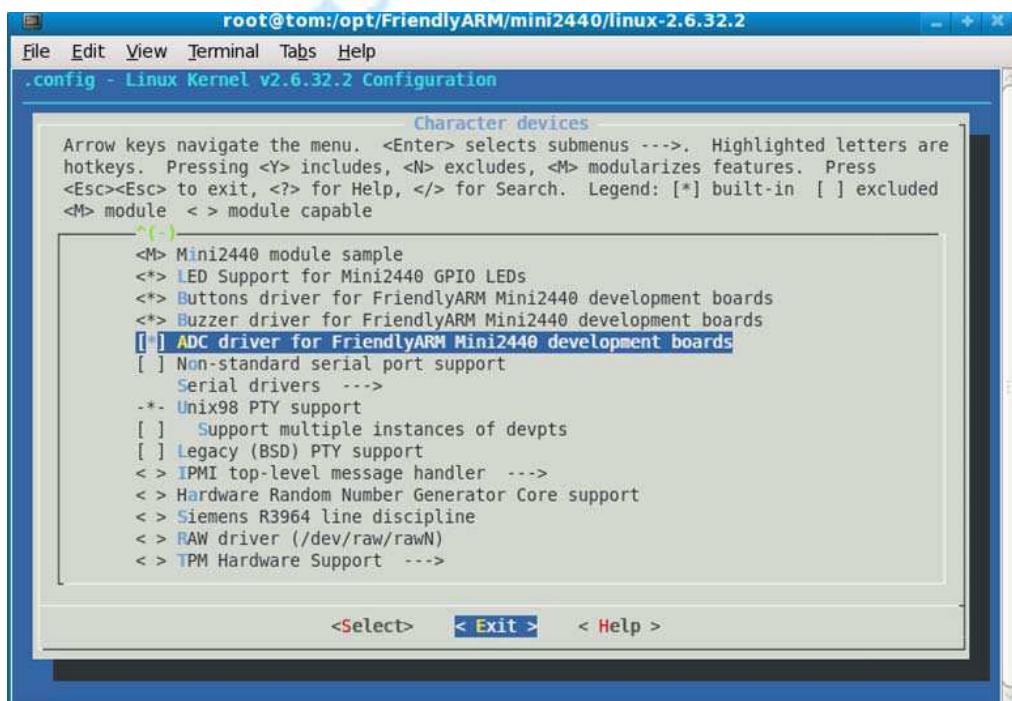
### 6.3.15 Configuring PWM control and buzzer driver

In menu, find and select the buzzer option, as shown in figure.



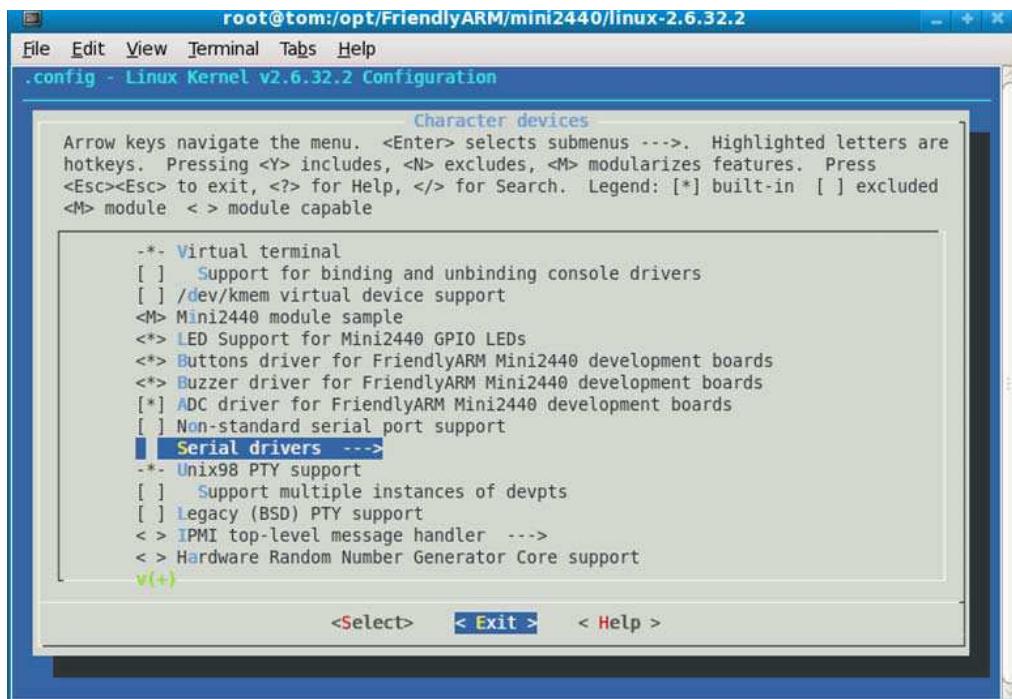
### 6.3.16 Configuring Analog to Digital converter (ADC) driver

In menu, find and select the option to ADC, as shown in figure.

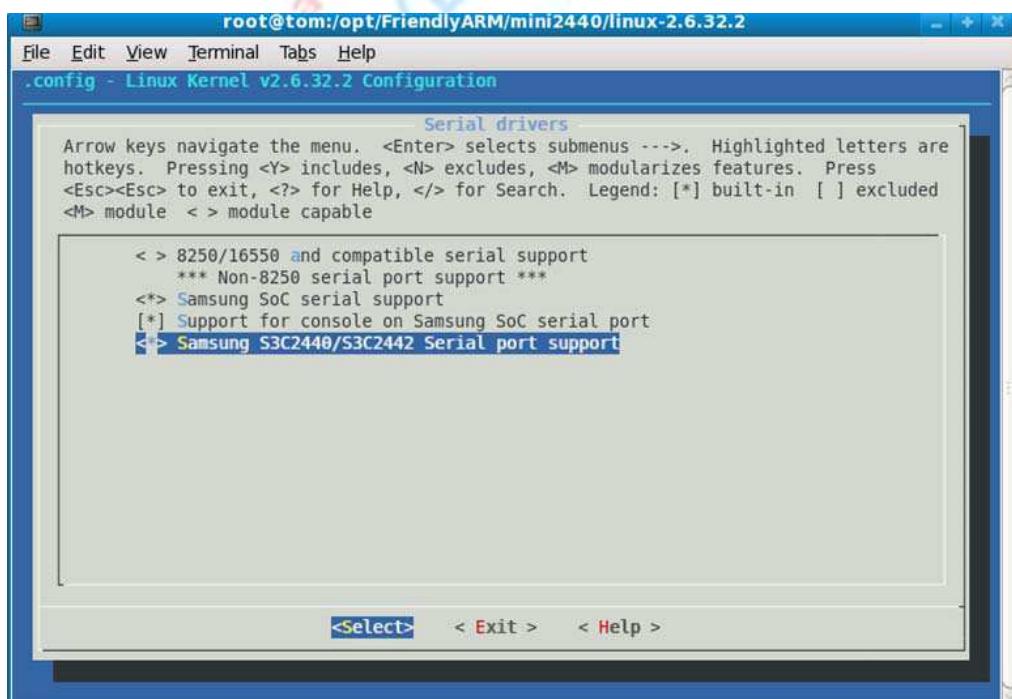


### 6.3.17 Configuring Serial Port driver

In menu, choose to enter Serial drivers.

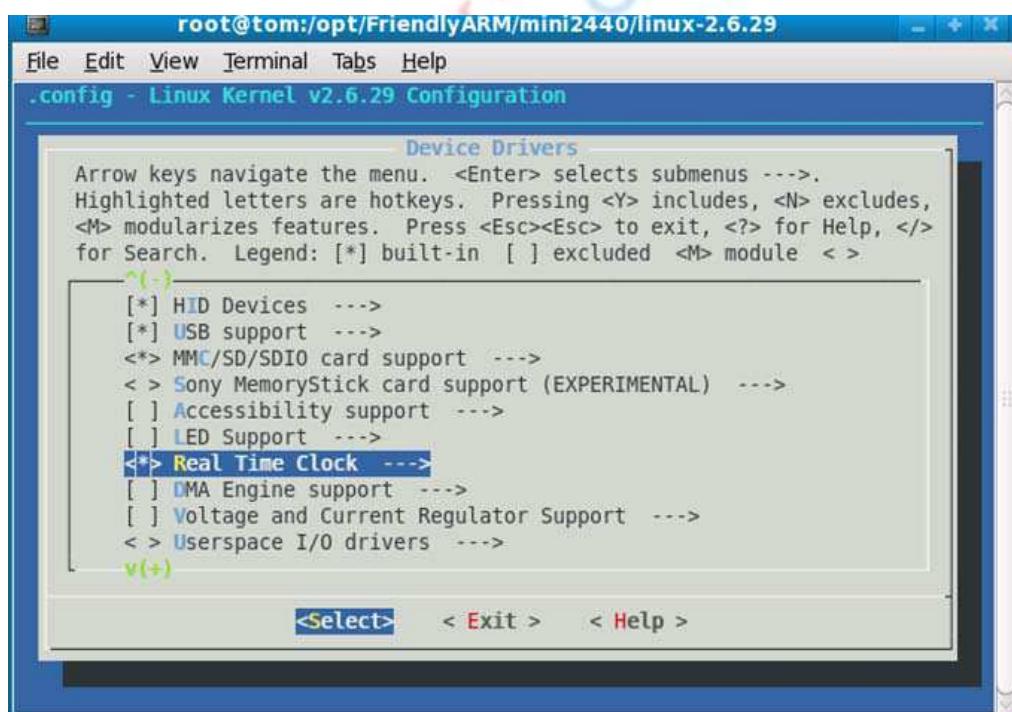
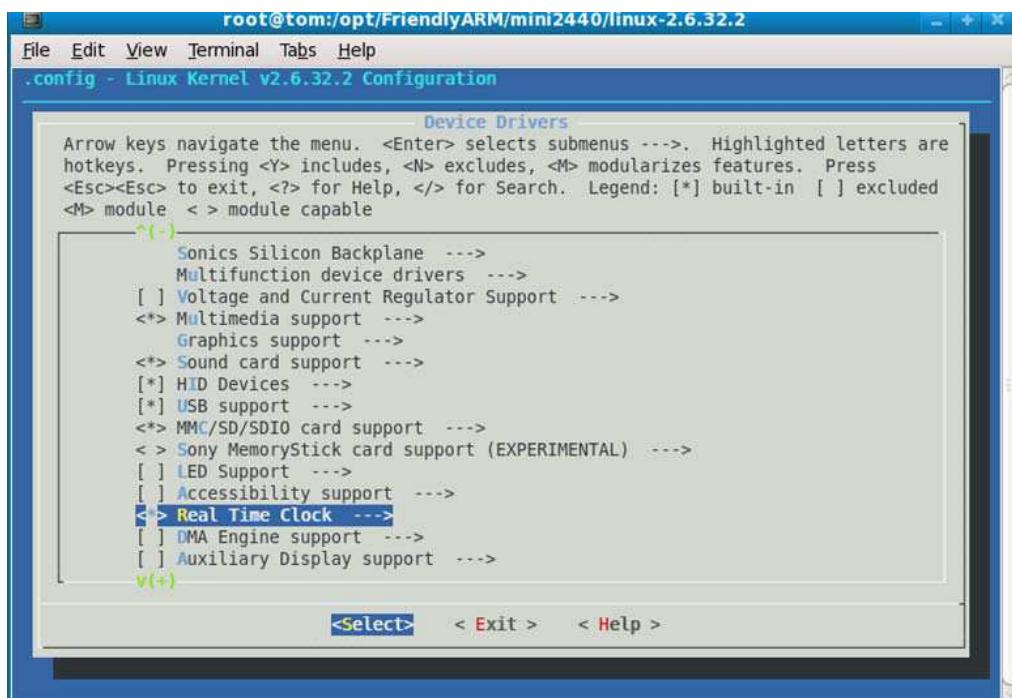


Select options shown in figure, to configure the serial port driver.

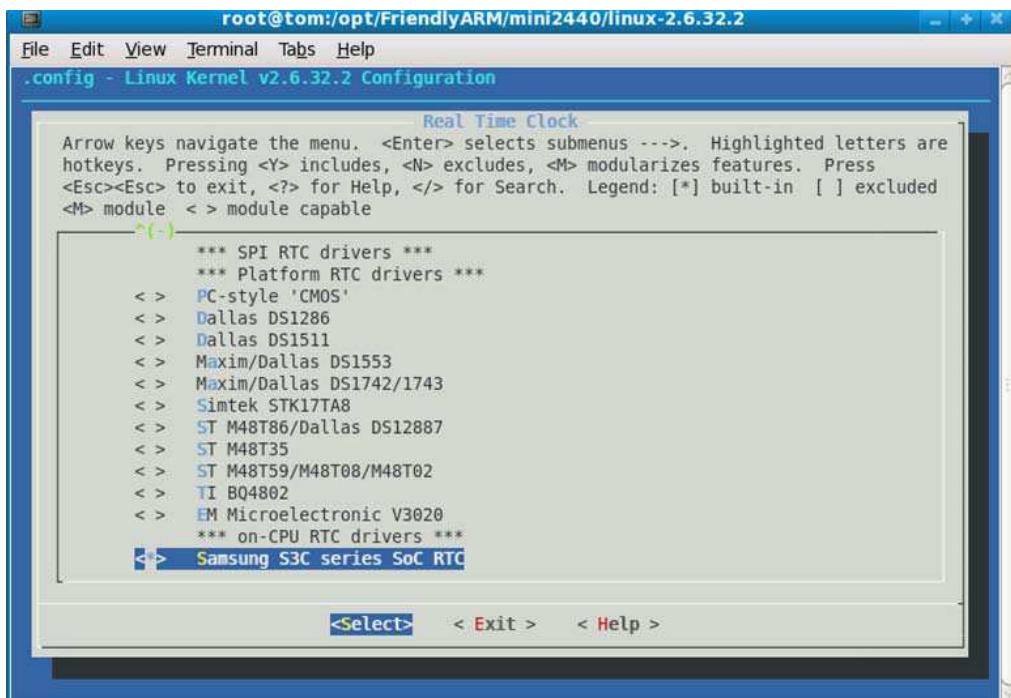


### 6.3.18 Configuring RTC Real Time Clock driver

Still in the Device Drivers menu, select options and enter the “Real Time Clock”.



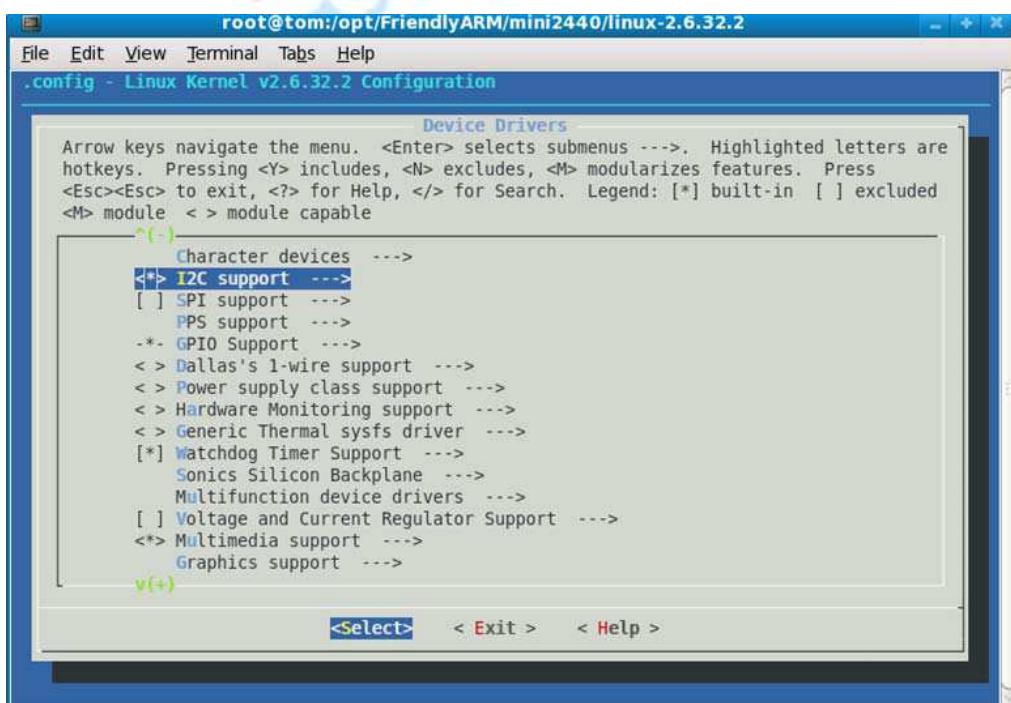
Select 2440 system as shown in figure RTC driver support.



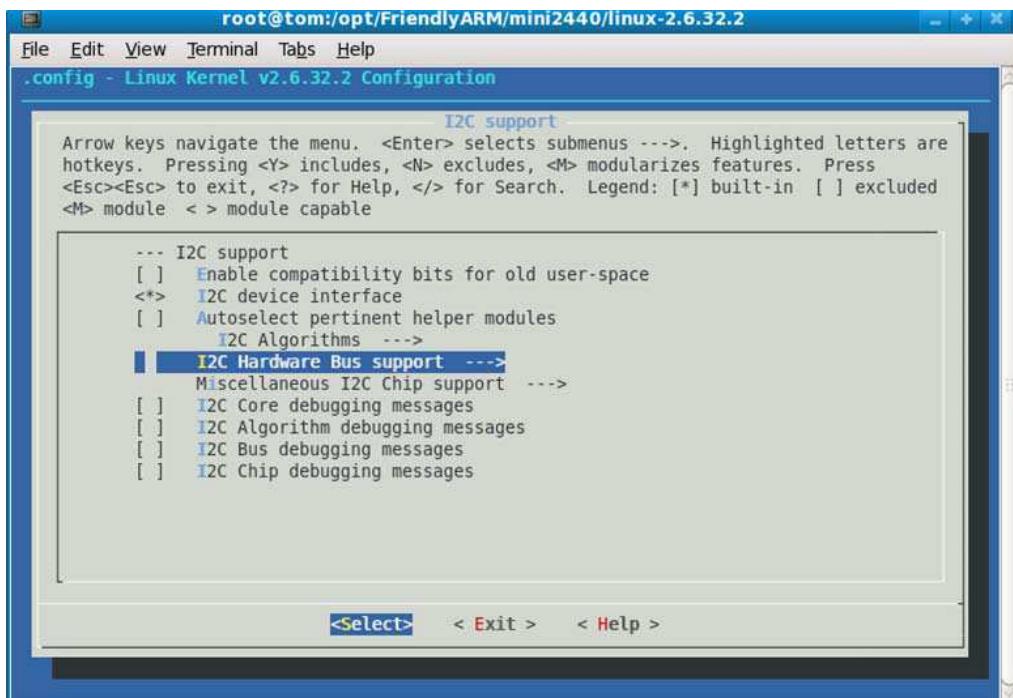
Return to the main menu.

### 6.3.19 Configuring I2C EEPROM driver

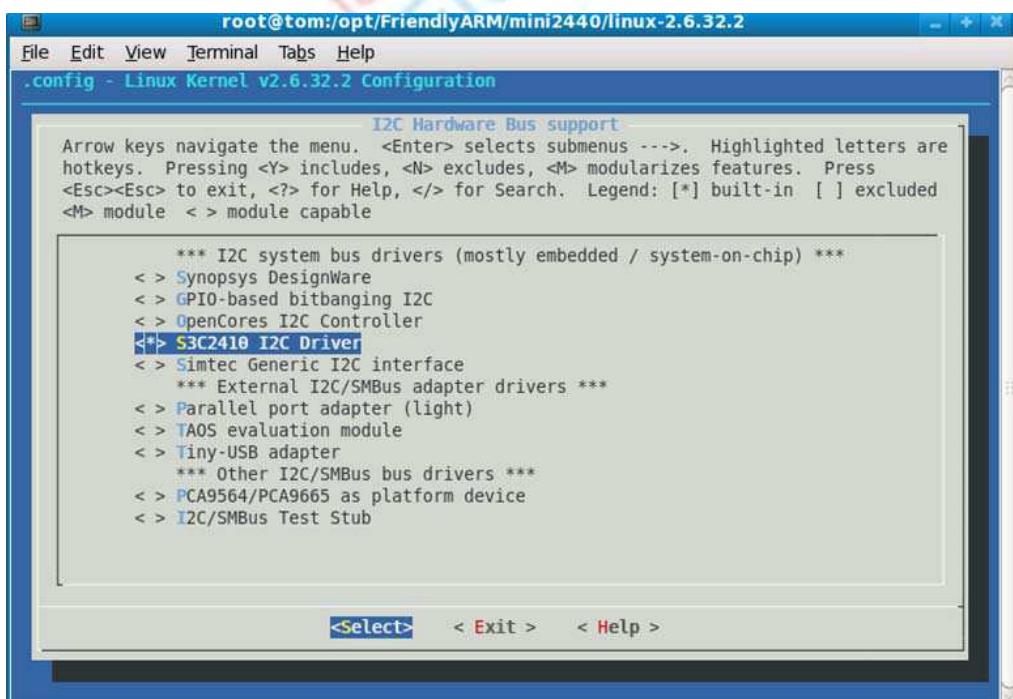
At Device Drivers menu, find the I2C support items, select to enter.



Show in the menu and then select, and access I2C Hardware Bus support sub key.

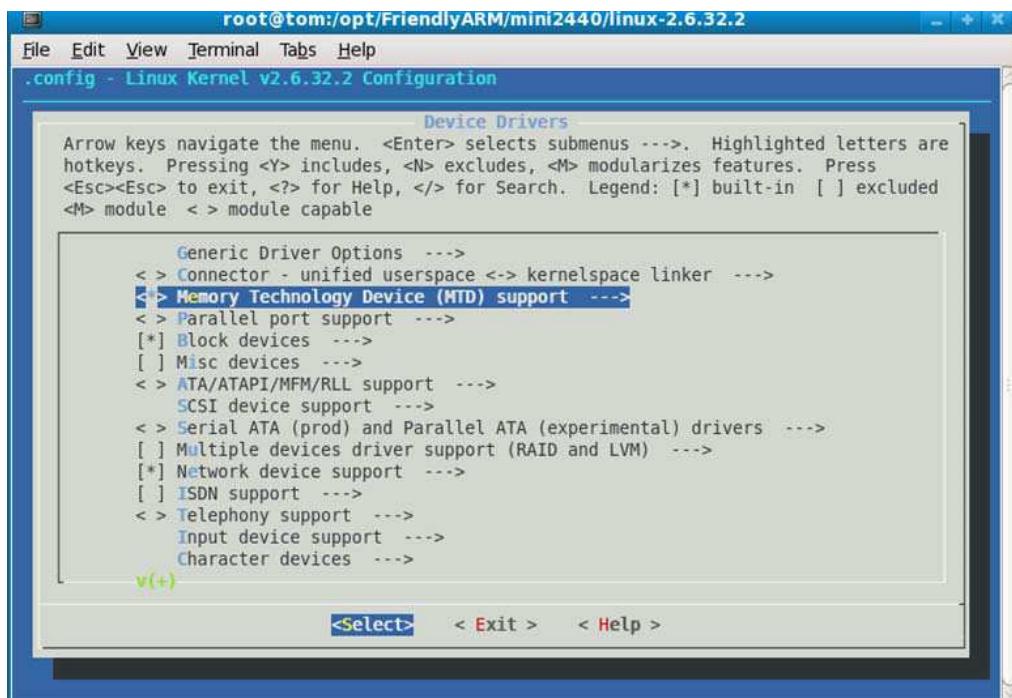


You can select S3C2410 I2C Driver, as shown in figure.

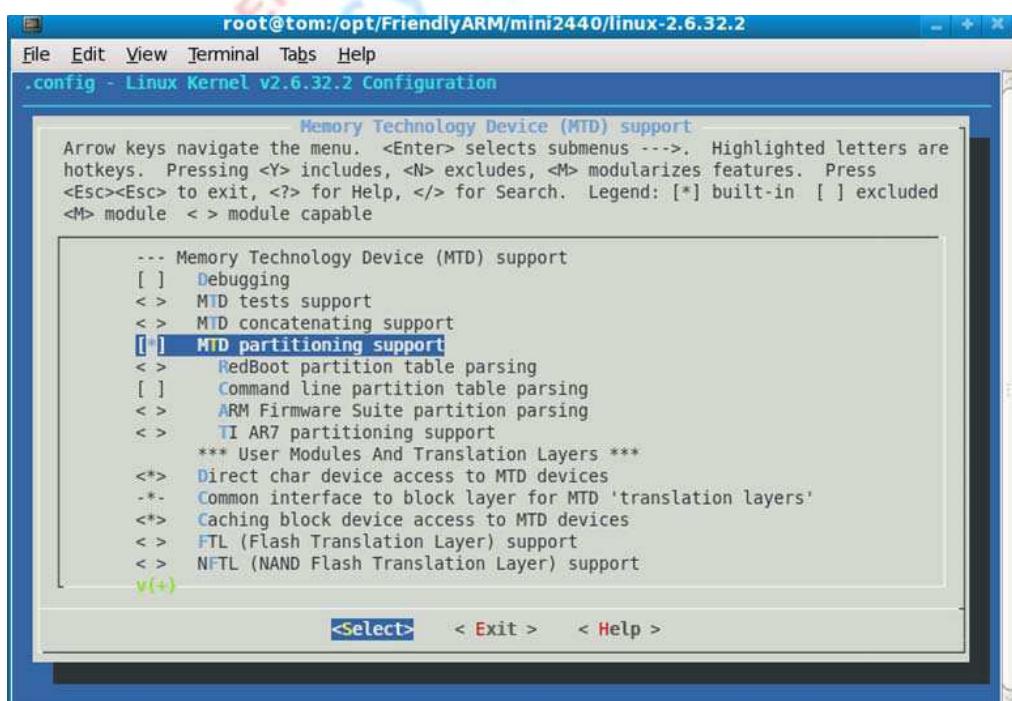


### 6.3.20 Configuring yaffs2 file system support

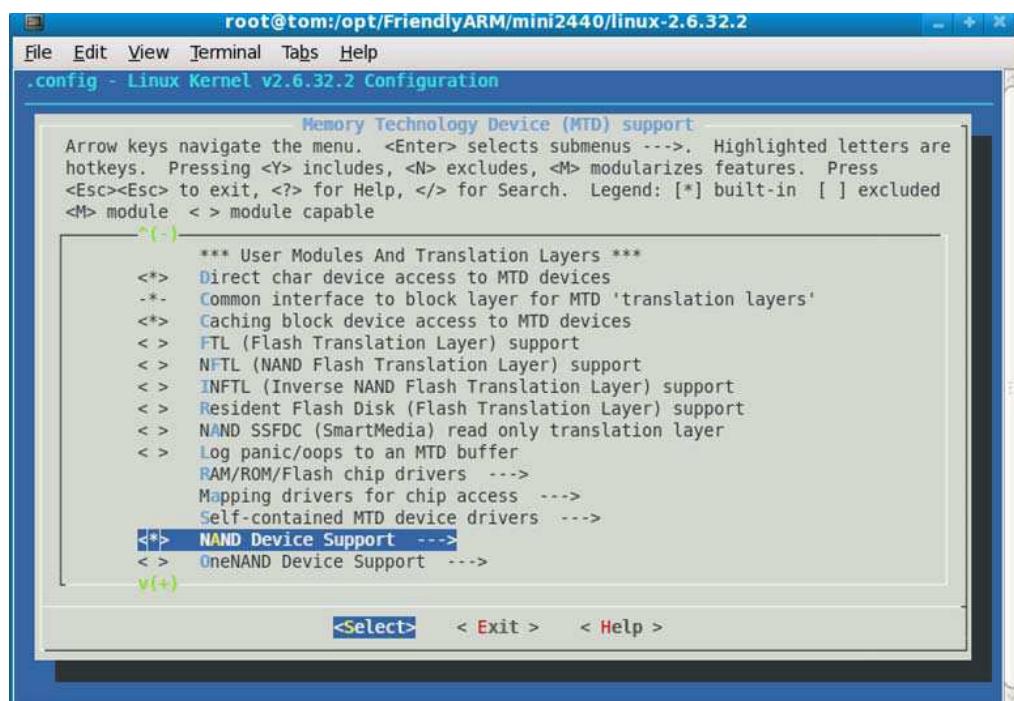
To use yaffs2 file system, you need to configure support for NAND flash driver, select Device Drivers MTD option shown, and press enter.



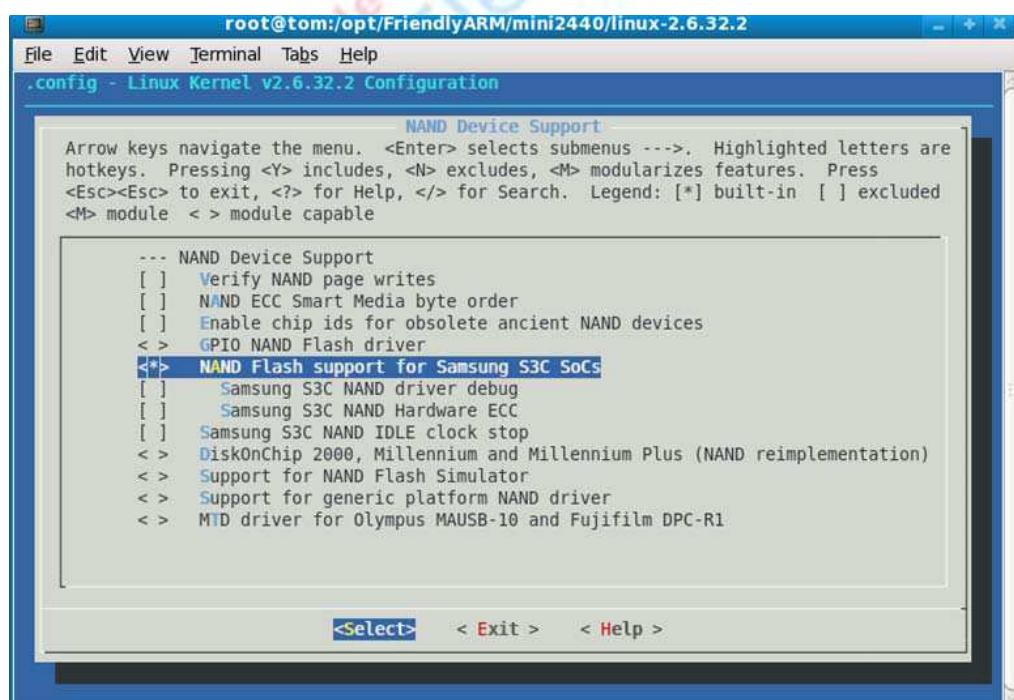
Note: the sub-menu <\*> number of options, do not cancel.



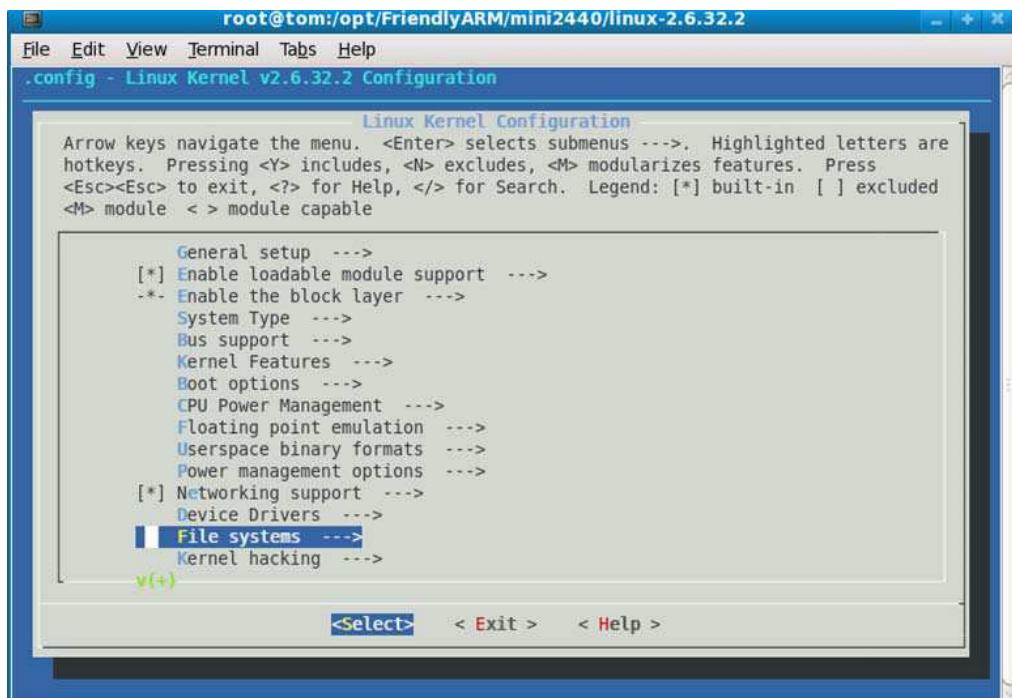
Find NAND Device Support option and access.



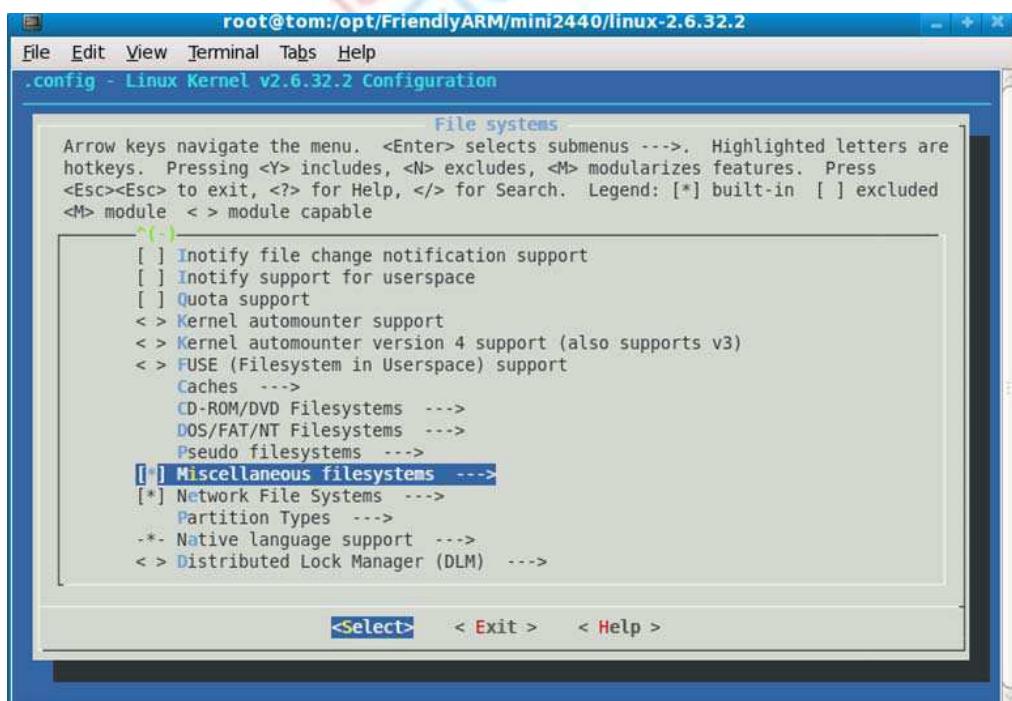
As shown in figure select NAND Flash driver support.



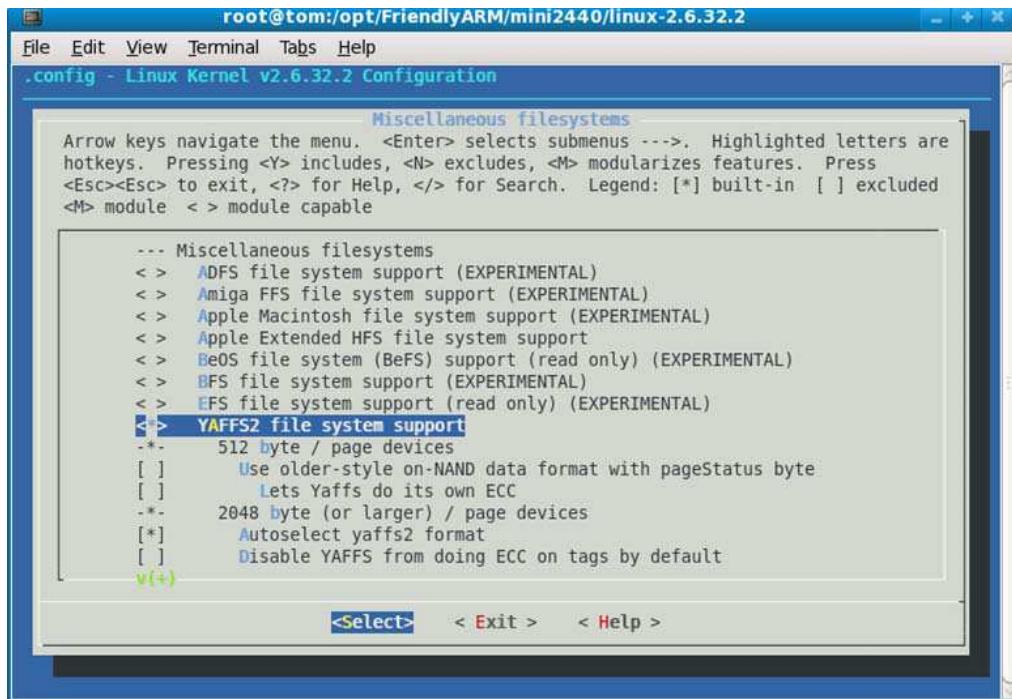
Returns to the main menu, and find the option access file systems.



Miscellaneous file systems and find the option access, as shown in figure.



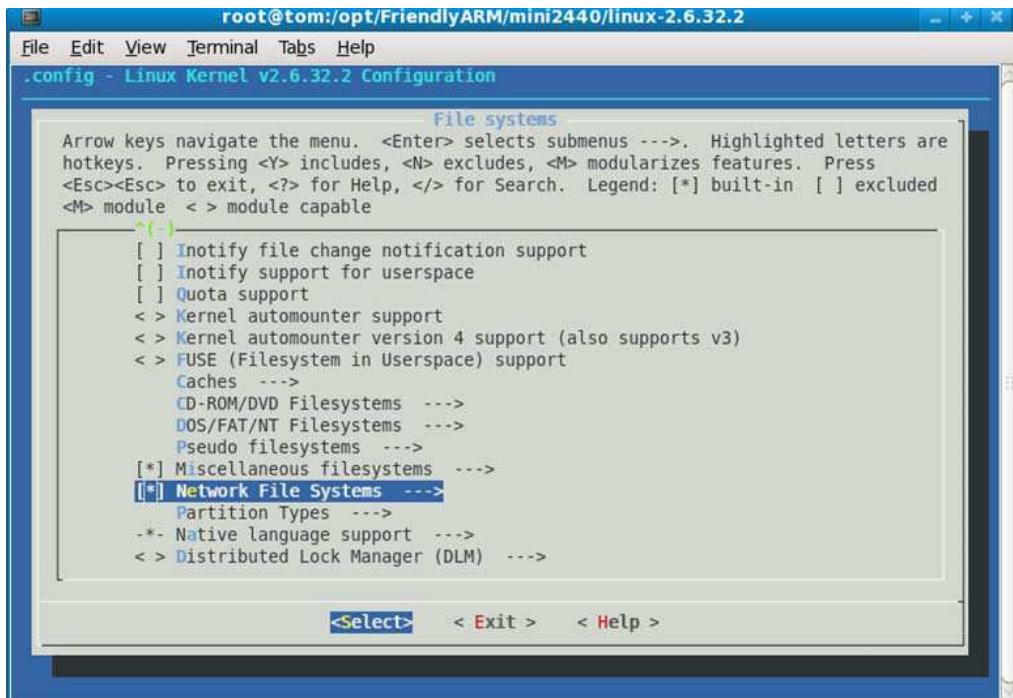
Find YAFFS2 file system support option, as shown in select.



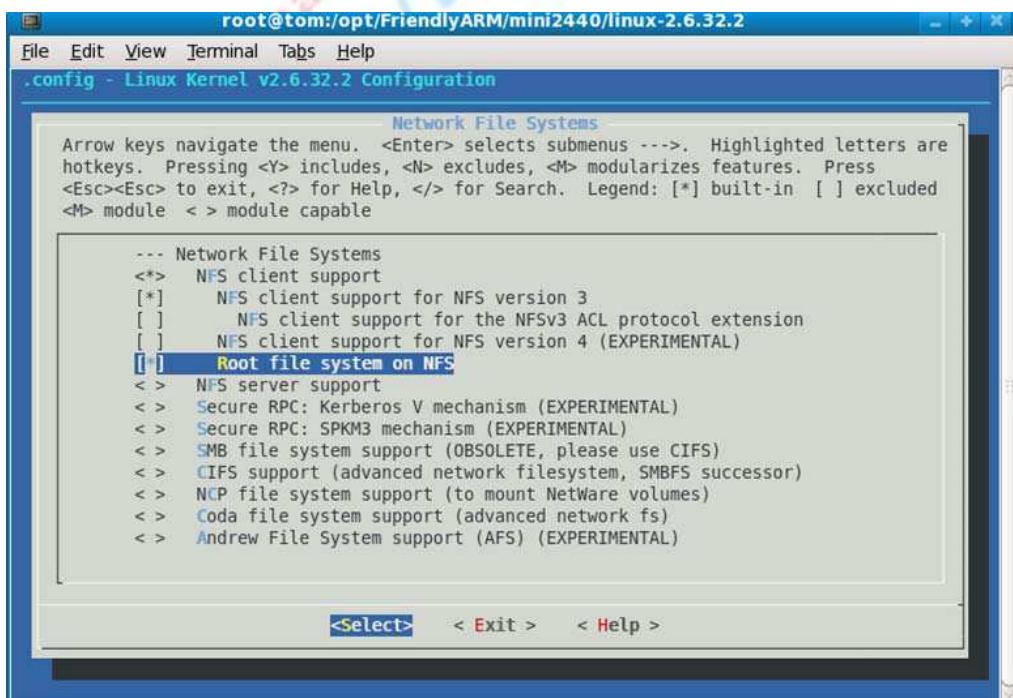
And then <Exit> return to File systems menu to the next step.

### 6.3.21 Configuring EXT2/VFAT/NFS file system, and etc.

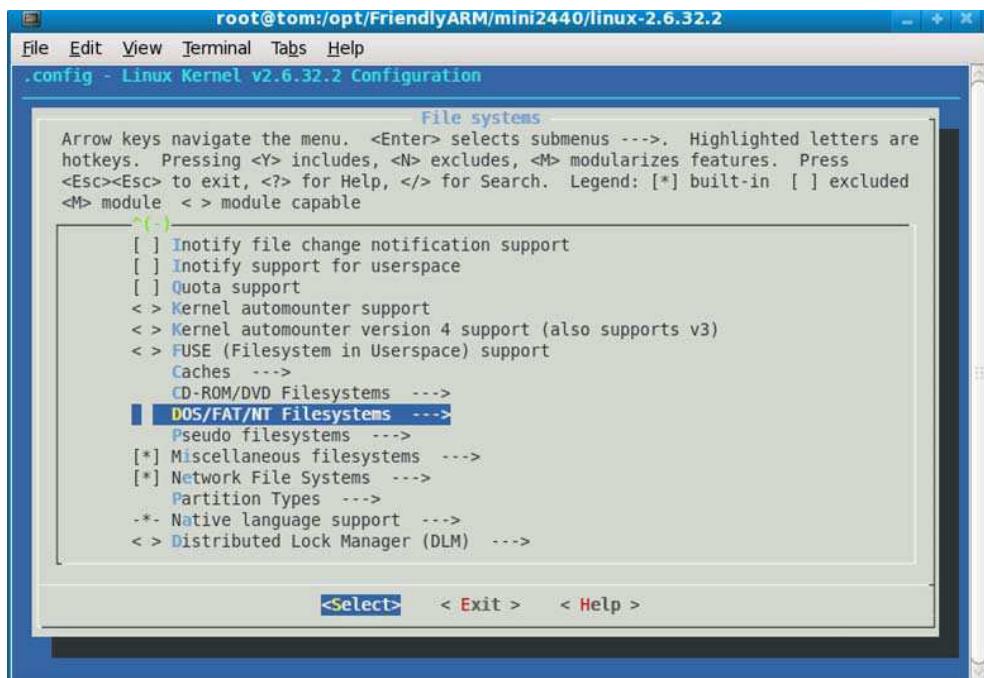
In the File systems menu, as shown in figure select “Network File Systems” support.



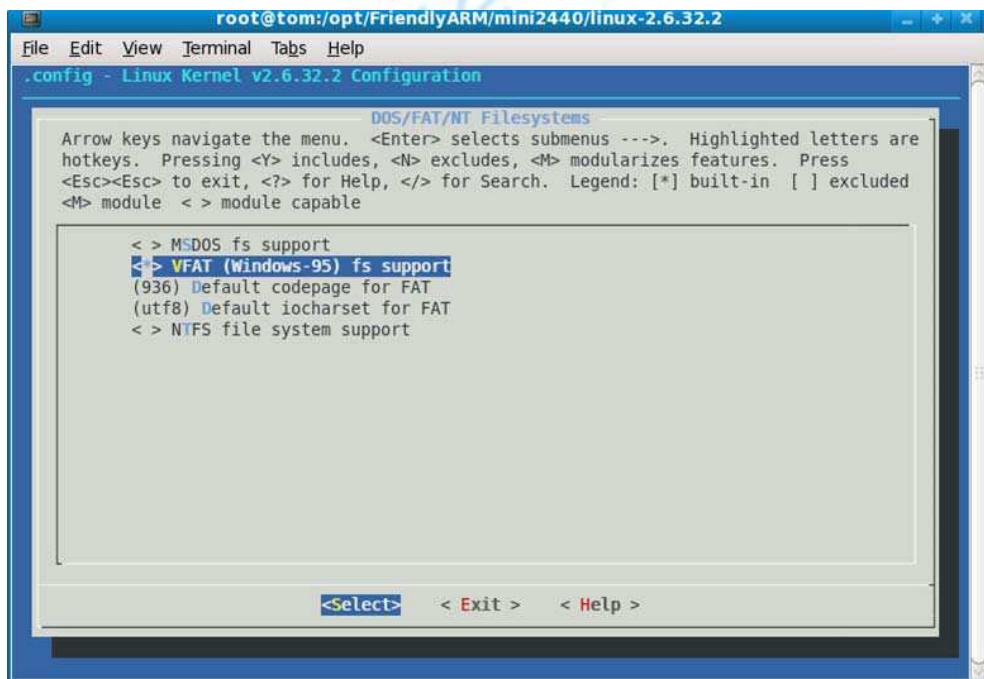
Select options as shown in figure, this configuration compile kernel that can boot via NFS system.



In order to support USB flash drives or SD cards and other storage devices used FAT32 file system, also need to configure the file system associated with this support, as shown in the File systems menu, select DOS/FAT/NT File systems option.



In this we select commonly used VFAT file system format, it can support FAT32.



Return to the kernel configuration the main menu, now you already know most of the common kernel configuration options, there're more kernel options then you need to practice and gradually learn to explore.

### 6.3.22 Make Linux logo

When you start the development board of the Linux system, image will be seen on a LCD screen.



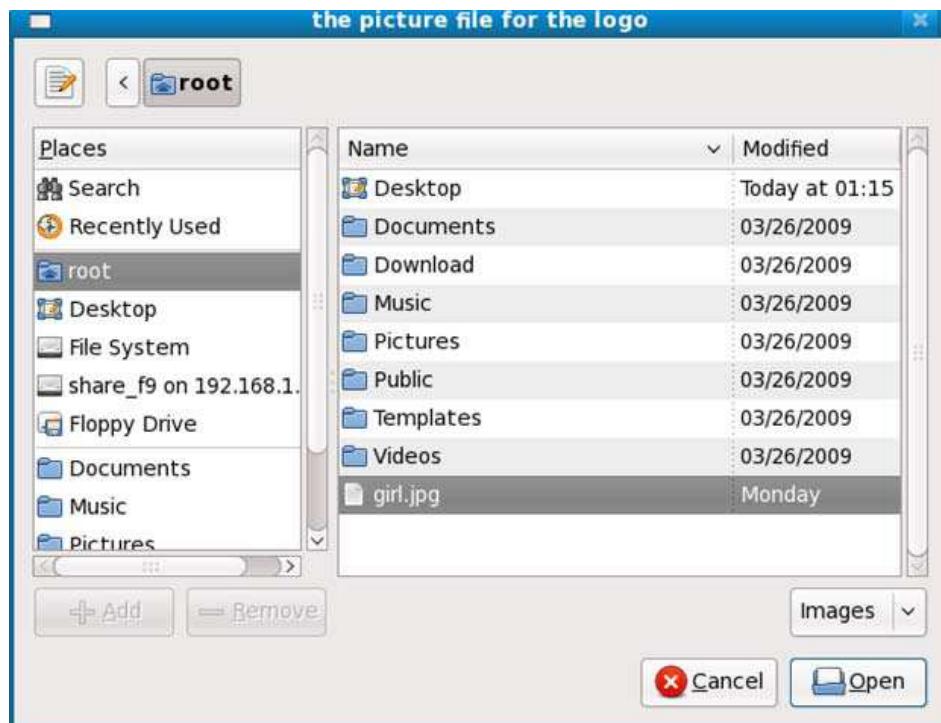
This is start Linux logo system, it's kernel a special image file format. That it's location in the kernel: linux-2.6.32.2/drivers/video/logo/linux\_logo\_clut224.ppm

There're many ways you can turn ordinary pictures into a logo file, we design a simple to use graphical interface of the authoring tools LogoMaker, which is based on Fedora 9 platform, can support bmp, png, jpg, and other file formats conversion, the following is that it is used.

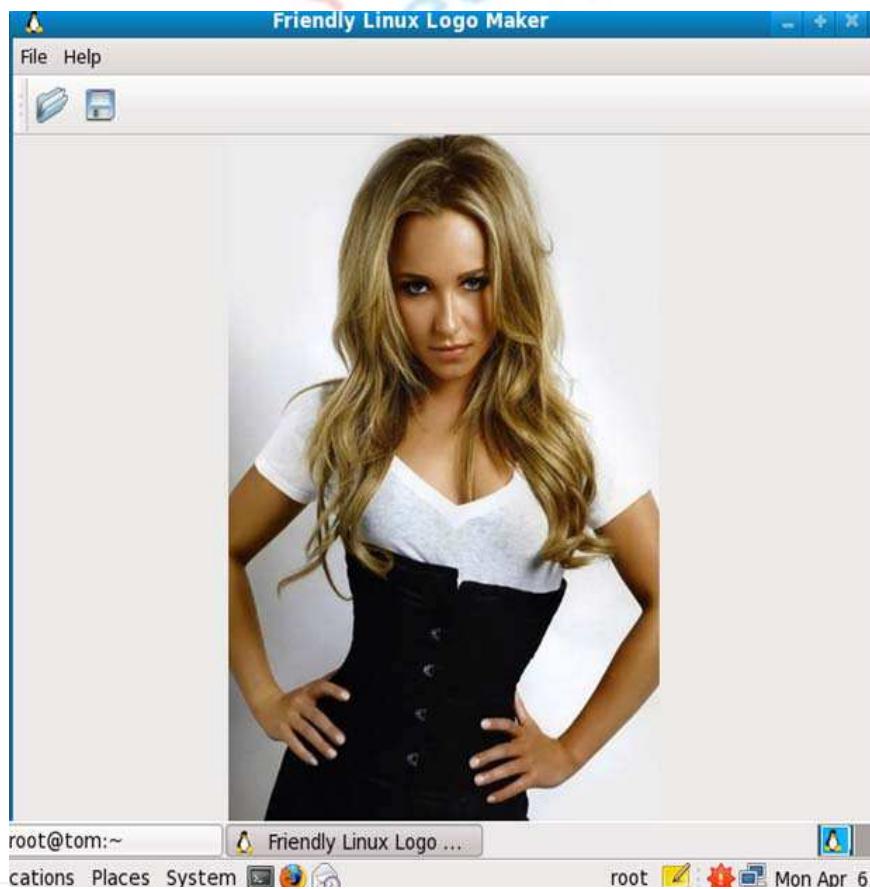
Please install according to the fifth chapter LogoMaker utility, at any command-line input LogoMaker, you can start it, open that it will display a default flower pictures, as shown.



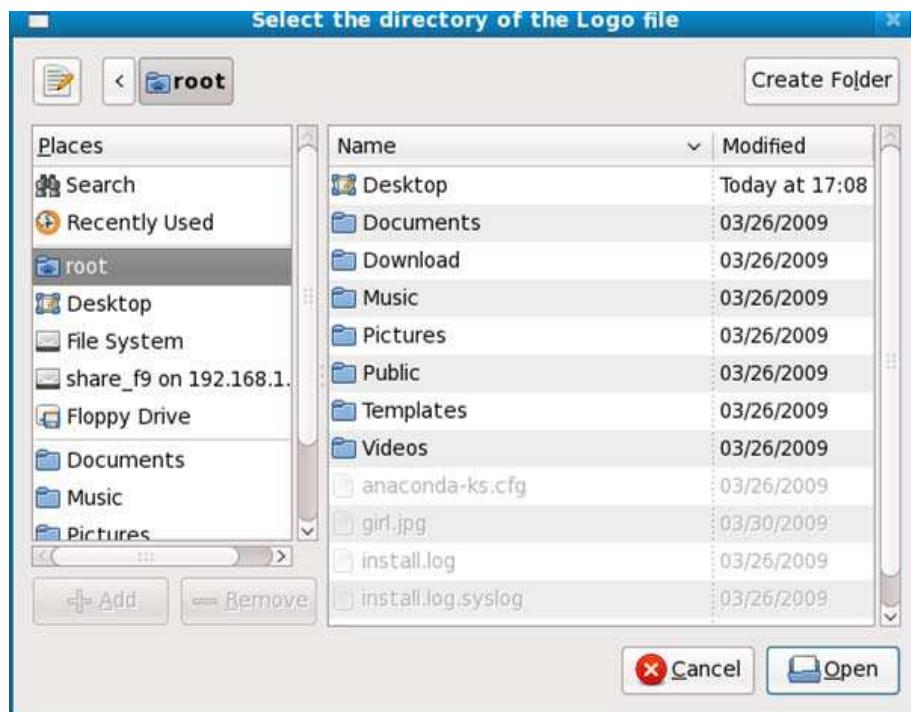
Click “File > Open” a picture file ... or use the shortcut “Ctrl + O” to open a picture file; open the file at pop-up window select a picture.



Picture will be displayed in LogoMaker window, as shown in figure.



At this click File > Convert the picture to a Linux Logo file, or use the shortcut "Crtl + C" to save the file directory then window will pop up, not need to enter anything, you can select the directory you want to save the file name will be automatically saved as linux\_logo\_clut224.ppm, use this file instead linux-2.6.32.2/drivers/video/logo directory under the same name can be.



LogoMaker easy instructions shown (click menu "Help > About" to open it).

